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MEDICINE HAT FLOODPLAIN STUDY
SUMMARY REPORT

Flooding at Medicine Hat - June, 1953

Water Resources

Alberta
ENVIRONMENT
Water Resources Management
Services
Technical Services Division

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MEDICINE HAT FLOODPLAIN STUDY

SUMMARY REPORT

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WATER RESOURCES MANAGEMENT SERVICES
TECHNICAL SERVICES DIVISION

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FOREWORD

A detailed hydrologic and river hydraulics study has been undertaken to delineate the 1:100 year flood risk areas adjacent to the South Saskatchewan River, Ross Creek and Seven Persons Creek in the City of Medicine Hat. The study results indicate that several areas within the City of Medicine Hat are situated in the 1:100 year flood risk zone. Included among these are much of the South Flats district (including the Purmal subdivision) along Ross Creek and Seven Persons Creek; portions of the North Flats, Riverside and Harlow districts bordering on the South Saskatchewan River; as well as the major city parks (Lion's Park, Strathcona Park, Police Point Park and Kin Coulee Park) located adjacent to the river system. Some of the lands bordering the river channels in the recently annexed areas are also flood prone.

This summary report contains the resultant flood risk maps, as well as computed water surface profiles for various flood discharges. The history of past flooding at Medicine Hat is included, along with a synopsis of the study methodology and descriptions of flood prone areas. A detailed account of the hydrologic and hydraulic analysis is available in the main study report, copies of which may be obtained from the Technical Services Division of Alberta Environment.

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1.0 INTRODUCTION

1.1 Study Objectives

The objective of this study is to delineate the 1:100 year flood risk areas along the South Saskatchewan River and its tributaries at Medicine Hat. The determination of flood risk zones is important to city and regional planning authorities, as well as the private sector involved in land development adjacent to the river system. Accurate knowledge of flood levels is essential when assessing flood damages or floodplain management alternatives and in planning flood emergency measures.

The 1 in 100 year flood (one percent probability of occurrence) has been adopted by Alberta Environment as the minimum criteria for flood risk mapping in the Province of Alberta.

1.2 Study Area

The study area (Figure 1) includes three river reaches, namely the South Saskatchewan River, Ross Creek and Seven Persons Creek. The main study reach on the South Saskatchewan River begins just west of Redcliff, approximately 12 kilometres (km) upstream of the Trans Canada Highway bridge. It ends about 20 km downstream of the Maple Avenue traffic bridge, just beyond the present city limits. The total length of river involved is approximately 35 km.

The study area also includes the two tributaries from the present city limits to the confluence with the South Saskatchewan River. The reach lengths are 3 km and 11 km for Ross Creek and Seven Persons Creek, respectively.

2.0 HISTORICAL REVIEW OF FLOODING

Since the establishment of Medicine Hat at the confluence of the South Saskatchewan River and Seven Persons Creek late in the last century, there have been a number of major floods. The following sections provide an overview of past flooding on the South Saskatchewan River and its tributaries at Medicine Hat. Additional information is provided in Appendix A - Newspaper Accounts of Past Flooding at Medicine Hat, and Appendix B - Flood Photographs.

2.1 South Saskatchewan River

The two largest floods on the South Saskatchewan River at Medicine Hat, for which discharge estimates are available, occurred in 1902 and 1908. The peak discharges for these two floods have been estimated by the Water Survey of Canada (W.S.C.) to be 5660 cubic metres per second (m^3/s) and 5240 m^3/s, respectively. It is also known that there was a significant flood in 1897, however, information contained in old newspaper reports suggest that it was a much smaller flood than the floods of 1902 and 1908. Reasonably reliable estimates of stage for the 1902 and 1908 floods have been made[1]* based on interviews with old time residents of the areas affected and from records kept by the then, Calgary District Office of the Federal Water Resources Branch (now Water Survey of Canada). It is interesting to note that the 1908 flood was approximately

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* Numbers in parenthesis refer to numbered references in the list of references.

equal in magnitude to the current estimated 1:100 year flood (5230 m^3/s), whereas the 1902 flood was about 8% higher. Excerpts from the July 10, 1902 edition of the Medicine Hat News, describing the flood of 1902, are presented in Appendix A.

The June 11, 1953 flood is the largest since the systematic collection of records on a continuing basis was initiated at Medicine Hat in 1911. This flood, which is the third largest during the historical period, is thoroughly documented in a publication entitled, "Flood of June 1953 in the South Saskatchewan River Basin"[1]. It resulted from a massive storm which brought heavy precipitation over a large portion of the South Saskatchewan River basin during the latter part of May and the first two weeks in June of that year. Peak discharge at Medicine Hat was 4300 m^3/s (82% of the estimated 1:100 year flood), reaching a stage of 8.90 m at the W.S.C. gauging station near the Finlay traffic bridge. No lives were lost in the 1953 flood, but damages to private property, municipal property, railway bridges etc., was extensive. Sections of the city hardest hit were the old Purmal subdivision and the industrial area east of the C.P.R. main line (see photo on front cover of report). Flooding also occurred in the Riverside district, in the area surrounding the Athletic Park, as well as in areas now occupied by Lions Park, Strathcona Park and Police Point Park. Actual accounts of the flooding are presented in Appendix A. Flood photographs are included in Appendix B.

Other large floods occurred in 1923 (4110 m^3/s), 1929 (3450 m^3/s) and 1975 (3170 m^3/s). The more recent flood of

June 23, 1975 was well documented by Alberta Environment. Details of a highwater mark survey obtained during this flood are presented in Appendix A of the Main Report[2].

Flooding due to ice jamming in the study reach is only known to have occurred once during the period of record, that being in 1951. The 1951 jam resulted when massive quantities of ice floes became anchored in a sharp bend in the river several kilometres downstream of the city proper. Within a few hours on March 31, 1951, the jam had built upstream past Medicine Hat, abruptly increasing river stage and backing up water on both Seven Persons and Ross Creeks. The jam held for five days despite repeated attempts to dislodge it with a series of aerial bombs dropped by the Royal Canadian Air Force. Army demolition experts from Chilliwack, B.C. finally succeeded in blasting the jam on April 4.

The river stage reached as a result of the ice jam in 1951 is estimated to be about 0.4 m less than during the 1953 flood. However, the overall flood situation in the South Flats section of the city appears to have been worse in 1951 than in 1953, due to the fact that spring runoff waters from Seven Persons and Ross Creeks peaked during the same period. Newspaper accounts (Appendix A) indicate that more than 60 homes were flooded, 12 families evacuated and several industries had to be closed down for the duration of the flood. Flood photographs are included in Appendix B.

Table 2.1 lists the seven largest floods on the South Saskatchewan River at Medicine Hat on the basis of stage recorded at the Finlay traffic bridge.

Table 2.1

Largest Recorded Floods at Medicine Hat

Rank	Date	Discharge[1] (m^3/s)	Stage[2] (m)
1	July, 1902	5660	10.22[E]
2	August, 1908	5240	9.81[E]
3	June 11, 1953	4300	8.90
4	March 29, 1951	Ice Jam	8.50
5	June 3, 1923	4110	8.46
6	June 23, 1975	3170	7.83
7	June 5, 1929	3450	7.81

[1] Maximum instantaneous discharge (W.S.C. Station No. 05AJ001).
[2] Stage is referenced to present gauge datum = 652.04 m (Geodetic).
[E] Estimated (Ref. 1).

2.2 Ross Creek and Seven Persons Creek

Ross Creek and Seven Persons Creek join to form one channel about 700 m upstream of their actual confluence with the South Saskatchewan River at the east end of Medicine Hat. The confluence region and the areas adjoining the lower reaches of both creeks are low-lying and extremely vulnerable to flooding. Flooding in these areas has occurred in the past due to high flows on the creeks, high water levels on the South Saskatchewan River, ice jams at the confluence or combinations of these factors. Each of the major floods on the South Saskatchewan River (Table 2.1) resulted in water backing up the two tributary creeks and causing varying degrees of flooding in the South Flats section of the city. The industrial areas east of the C.P.R. main line and the Purmal subdivision have usually faired the worst on these occasions.

The most destructive flood ever recorded at Medicine Hat occurred in late March 1952, as a result of unusually high spring runoff on both tributary creeks. On Seven Persons Creek a maximum instantaneous discharge of 136 m^3/s, which is about 12% higher than the current estimated 1:100 year flood (121 m^3/s), was measured on March 31 of that year. This is the largest flow recorded on Seven Persons Creek since stream flow records began in 1912. The peak discharge on Ross Creek was not measured at Medicine Hat, however, by all accounts it too was one of largest flows to be witnessed this century.

The flooding in 1952 continued over a period of about a week (from March 27 to April 2) and affected the following areas:

- South Flats industrial district;
- Purmal subdivision;
- residential district between Kingsway Avenue and Allowance Avenue, south of 6th Street S.E.; and
- properties adjoining Kipling Street, Spencer Street and Marshall Avenue.

Approximately 1000 people were evacuated from about 250 residences during the height of the flood and many businesses and factories were forced to close. Damage to railway and city bridges was extensive and personal property losses were high.

Newspaper accounts of the 1952 flood are presented in Appendix A. Flood photographs are included in Appendix B.

3.0 STUDY METHODOLOGY

The following sections provide a summary of the methods used in the hydrologic analysis and in the computation of the water surface profiles (flood levels), upon which the flood risk maps are ultimately based. Details of the more technical aspects of the study are available in the Main Report[2].

3.1 Hydrology

This portion of the study was conducted by the Hydrology Branch, Alberta Environment. A detailed analysis of recorded flows on the South Saskatchewan River and its tributaries, Ross Creek and Seven Persons Creek, was undertaken to estimate the probability of occurrence of future floods at Medicine Hat. This analysis took into account the effects of the principle flood moderating influences in the respective basins, namely diversion and reservoir regulation. The following is a summary of the main aspects of the Hydrology Branch report.

For the South Saskatchewan River, it was concluded that during major flood events, neither diversion to irrigation districts nor the effects of reservoir regulation would have an appreciable influence on the flood peak at Medicine Hat. The Pearson III frequency distribution was selected to assign flood probabilities based on the completed annual series of maximum instantaneous discharges for the historical period 1898 to 1984.

Seven Persons Creek above Medicine Hat has been regulated since 1955, however, due to insufficient data on storage levels and operations procedures, the effects of regulation on peak flows could not be determined. For the purpose of this study only the natural flows prior to 1955 were used in the flood frequency analysis and it was assumed that the effects of storage on the 1:100 year flood peak would be minimal. The Pearson III frequency distribution was used to assign flood probabilities based on the completed annual series of maximum instantaneous discharges for the non-regulated period 1913 to 1954.

No stream flow measurements are available for Ross Creek at Medicine Hat and hydrometric Station 05AH003 near Irvine records flows from only 41 percent of the Ross Creek basin. Consequently, a regional analysis was performed to enable flood peak estimates to be made for Ross Creek at Medicine Hat. The analysis included flow data from Ross Creek near Irvine, Gros Ventre Creek near Dunmore and Peigan Creek near Pakowki Road.

Table 3-1 summarizes the flood frequency analysis for the South Saskatchewan River, Seven Persons Creek and Ross Creek at Medicine Hat. The majority of the maximum annual flood peaks on the tributaries occur in March or April, usually within a few days of each other. Thus, in this study peaks on Seven Persons Creek and Ross Creek were assumed to be coincident. Flood peaks on the South Saskatchewan River normally occur in late May or June and therefore cannot be assumed to coincide with peaks on the tributaries.

Table 3-1

Flood Frequency Estimates

Return Period (years)	Maximum Annual Instantaneous Discharge (cms)		
	South Saskatchewan River at Medicine Hat	Seven Persons Creek Above Ross Creek Confluence	Ross Creek Above Seven Persons Creek Confluence
2	1060	14.9	27.0
5	2010	38.2	57.5
10	2750	56.9	79.9
20	3490	76.0	102
25	3740	82.2	109
50	4480	102	130
100	5230	121	152
200	5990	141	173

3.2 River Surveys

A total of 148 cross sections were surveyed for this study, including 77 on the South Saskatchewan River, 49 on Seven Persons Creek and 22 on Ross Creek. The cross section surveys, which involved both on land surveys and river soundings, were performed by the Survey Branch of the Technical Services Division, Alberta Environment, during 1981 and 1982.

The locations of the surveyed cross sections are shown on the flood risk maps (Figures 5 and 6).

3.3 Calculation of Flood Levels

Water surface profiles (flood levels) were calculated using the HEC-2 computer program developed by the U.S. Army Corps of Engineers' Hydrologic Engineering Centre[3]. This program is designed to simulate steady gradually varied flow conditions in natural open channels, and can handle both subcritical and supercritical flows. The effects of structures such as bridges, culverts and weirs can also be modelled. The basic assumptions and limitations of the HEC-2 model are:

1. The channel bed and banks are fixed (rigid) as compared to the actual river which is subject to scour and deposition during floods.
2. The discharge is assumed to be steady (does not fluctuate with time).
3. Uniform hydrostatic pressure distribution is assumed across the channel sections, resulting in a level water surface from one bank to the other.

4. Velocity components are assumed to be in the direction of flow, therefore total energy head is considered the same at all points across the section.
5. The river channel slope is assumed small (less than 1 in 10).

Computer models were constructed for the South Saskatchewan River, Seven Persons Creek and Ross Creek from the channel cross sections, which were surveyed for this study. The models were then calibrated to ensure that the computer generated water surface profiles satisfactorily reproduced known highwater mark data collected during actual floods.

The South Saskatchewan River model was calibrated against highwater mark data obtained during the June 1975 flood, which had a return period of about 15 years. The model was then verified for higher discharges by comparing computed results to recorded highwater mark data from the historic flood of 1908 (1:100 year event) and the more recent flood of June 1953 (1:70 year event). It was further calibrated, for lesser discharges, using the stage-discharge rating curve for hydrometric Station 05AJ001, which is located at the Finlay Traffic bridge in Medicine Hat. Based on the calibration results, a channel hydraulic roughness coefficient (Manning's 'n') of 0.028 was selected to compute the flood profiles which are presented in Figure 2.

The Seven Persons Creek model was calibrated using highwater marks obtained from photographs (Appendix B) taken during the March 1952 flood, which is the largest flood on record and has a return period of about 170 years. Descriptions of the 1952 flood, as recorded in newspaper accounts, assisted in verifying the computer

generated flood profiles. Based on the calibration results, a channel roughness coefficient of 0.037 was selected for most of the study reach. Higher roughness coefficients (0.045 and 0.055) were used in the lower reaches near the confluence with Ross Creek and the South Saskatchewan River to reflect the heavier vegetation growth found within the channel in these areas. The computed flood profiles for Seven Persons Creek are presented in Figure 3.

It was not possible to carry out a direct calibration of the HEC-2 model for Ross Creek since reliable highwater mark data could not be found. Instead, roughness coefficients of 0.045 and 0.055 (nearest the confluence) were assumed taking into account the obvious similarities between the lower reaches of Ross Creek and Seven Persons Creek. These assumptions should not introduce significant errors since the HEC-2 model proved to be relatively insensitive to modest adjustments in Manning's 'n'. The computed flood profiles for Ross Creek are presented in Figure 4.

4.0 FLOOD RISK MAPPING

4.1 General

The computed flood levels were delineated on 1:5,000 scale orthophoto maps (contour interval = 1.0 m), which were produced by the Alberta Bureau of Surveying and Mapping from aerial photography flown in September 1983. The flood risk maps for the South Saskatchewan River are shown in Figure 5, which is made up of 13 map sheets and a map Index Plan (Sheet 1). The flood risk maps for Ross Creek and Seven Persons Creek are shown in Figure 6, which consists of 5 map sheets plus the map Index Plan (Sheet 1). To supplement the flood risk maps, Sections 6.4 and 6.5 contain brief descriptions of the flood risk areas and, where appropriate, information on flow depths and the flood damage potential during a 1:100 year flood.

4.2 The Confluence Region

The section of Medicine Hat in the vicinity of the confluence of Seven Persons Creek, Ross Creek and the South Saskatchewan River requires special consideration. This area which encompasses the eastern portion of the South Flats district, including the Purmal subdivision, is affected by both high backwater levels caused by major floods on the river, and by high inflows on the two tributaries. These two flood scenarios are statistically independent events since floods on the South Saskatchewan River normally occur during the summer months and those on the two tributaries normally occur in early spring.

For purposes such as emergency planning, it is useful to know what areas are at risk for a given flood situation. Separate maps have been prepared to show the 1:100 year flood risk areas associated with each of the two flood scenarios described above. It must be emphasized, however, that when dealing with the more general problem of assessing flood risk for land development and/or floodplain management purposes, the assessment should always be based upon the most severe flood condition. In this instance, a 1:100 year flood on the South Saskatchewan River results in higher stages in the confluence region downstream of the C.P.R. mainline (crosses Seven Persons Creek) and downstream of the Highway 41A crossing on Ross Creek (refer to Figure 5, Sheet 8). Upstream of these areas it is the 1:100 year flood occurring on the tributaries which results in the highest water levels (refer to Figure 6, Sheets 2 and 6).

4.3 Freeboard and Setback Requirements

It is normal practice to specify a minimum freeboard (vertical distance) above the computed 1:100 year flood levels to provide a safety factor against possible variations in the water surface profile resulting from:

- approximations inherent in the computational procedure;
- possible debris blockage or ice jamming, particularly at structures;
- possible sediment deposition; and
- superelevation of flow at bends.

Setback is generally referred to as the minimum horizontal distance, usually measured from the channel banks, wherein development would be strongly discouraged. Minimum setback distances are used to provide a safe distance between proposed developments and the river, taking into account the potential for:

- future channel shifting due to bank erosion;
- structural damage or erosion due to high flow velocities (i.e., in the case where landfill is being used to encroach upon the natural floodway); and
- slope stability problems (i.e., in the case of high banks).

Freeboard requirements and minimum setback distances normally are determined on a site specific basis taking into account the above noted factors.

4.4 Flood Risk Maps - South Saskatchewan River

The flood risk maps for the South Saskatchewan River are discussed beginning at the upstream end of the study reach (Redcliff area) and proceeding downstream.

Redcliff Area (Figure 5, Sheets 2 to 4)

The Town of Redcliff is not affected by floods on the South Saskatchewan River due to its upland location. Flooding in the valley to the south and east of the town is limited to the low-lying portions of the valley flat or first terrace level. Just as the river follows a meandering course shifting alternately from one side of the valley to the other, the pattern of flooding similarly tends to switch from one side of the channel to the other. Where flooding

does occur, it is generally limited to a relatively narrow strip of open land bordering the river channel.

The recently developed Echo Dale Regional Park, located on the south side of the river in SE 5 and SW 4 Section 13-6-W4, would experience minimal flooding during a 1:100 year event. Existing structures in the park would not be affected.

West of the Trans Canada Highway (Figure 5, Sheet 5)

A portion of the Burnside Ranch property on the north side of the river in SE 34-12-6-W4 lies within the flood risk area. During a 1:100 year flood, flow depths around some of the buildings near the river bank would exceed 1.0 m and the flooding would extend as much as 250 m from the river banks, inundating several hectares of land under cultivation.

Flood levels would reach the top of the banks in the vicinity of the City of Medicine Hat Power and Water Plant just upstream of the Trans Canada Highway bridge, however, none of the buildings or major structures appear to be threatened.

Trans Canada Highway Bridge to Finlay Traffic Bridge (Figure 5, Sheet 6)

In the Harlow district, Harris Street S.W., running parallel to the river, would be inundated with floodwaters reaching a maximum depth of 1.0 m during a 1:100 year flood event. A number of properties on the south side of this street would be affected.

In the Riverside district flooding would occur south of 1st Street N.E., between 1st Avenue N.W. and 2nd Avenue N.E. Between 1st Avenue N.E. and 2nd Avenue N.E., flooding would also occur on

the north side of the street. The potential for damages would, in most cases, be limited to basement flooding, with residences located on the south side of 1st Street, being at greatest risk. Access to many of the properties in this area would be severely restricted during a 1:100 year flood.

The depth of flow at the intersection of Alta Wana Avenue and 1st Street N.E., would be close to 1.5 m, thus buildings near this location could potentially suffer damages at the first floor level. River Road leading under the Finlay Bridge would be inundated to a depth of about 2.0 m.

Finlay Traffic Bridge to Strathcona Park (Figure 5, Sheet 7)

River Road would be flooded on the south side of the river from 4th Avenue S.E. to the arena complex. The depth of flooding would reach a maximum of about 2.0 m in the section between the Finlay Bridge and the Maple Avenue Bridge. Similarly, on the north side River Road would be inundated between the Finlay and the C.P.R. bridges to a maximum depth of about 2.0 m.

During a 1:100 year event, floodwaters would surround the Arena complex and inundate the Athletic Park (Stadium) to a depth of 1.5 to 2.0 m. Residences along 2nd Street S.E. between Birch Avenue and Woodman Avenue would be affected. The depth of flooding on 2nd Street would be approximately 0.5 m at Allowance Avenue, increasing to about 1.0 m at Woodman Avenue. Potential damages would probably be limited to basement flooding west of Allowance Avenue, whereas, east of Allowance Avenue (towards Lions Park) there is a greater potential for flooding at the first floor level.

The Senior's complex (Luther Manor and Parkside Manor) on the north side of 2nd Street opposite the Athletic Park would be completely surrounded by water up to 1.0 m deep on the river side. Direct access to this facility would be cut off by the floodwaters. Lions Park is entirely within the flood risk zone as is the Veiner Center where the depth of water would reach about 0.7 m. Residential properties along 5th Street S.E. between Washington Avenue and Minto Avenue lie within the flood risk area, as do properties east of Minto Avenue and north of Balmoral Street. The Medicine Hat Greenhouses would also be flooded.

Most of Strathcona Park would be inundated by a 1:100 year flood on the South Saskatchewan River and any of the park structures constructed below Elevation 660.1 m would be subject to flooding. Police Point Park on the opposite side of the river lies entirely within the flood risk area, however the adjacent Medicine Hat Golf and Country Club is not subject to flooding.

Confluence Region - Backflooding (Figure 5, Sheet 8)

During a 1:100 year flood on the South Saskatchewan River, water would back up Seven Persons Creek and Ross Creek causing extensive flooding in the confluence region. The limits of backflooding are shown in Figure 5, Sheet 8 to include most of the Purmal subdivision adjacent to Ross Creek and portions of the South Flats industrial district adjacent to Seven Persons Creek. Water levels would reach a stage of 660.1 m, flooding several industries and commercial establishments, as well as residential properties in the area. Water would cover Industrial Avenue to a depth of up to

0.4 m between Bridge Street and Seven Persons Creek. The Porcelain Avenue Bridge leading to the Medicine Hat Brick and Tile property would be inundated by approximately 0.5 m of water.

Most of the flooding would occur east of the C.P.R. mainline, however, a smaller area immediately west of the C.P.R. between Smelter Avenue and Factory Street would also be affected. Some of the major industries and commercial establishments located in the flood risk area are:

Medicine Hat Brick and Tile
Medicine Hat Wholesale Foods Ltd.
Henderson Wholesale Building Products
Alpha Dairy Floods
Horne and Pitfield Floods Ltd.
Southern Car and Trailer Sales
Hat Salvage
Medicine Hat Feeding Company
Sherwood Packers

The greatest potential for damages, as far as residential property is concerned, is in the Purmal subdivision where the depth of water would reach 1.0 m or more in some locations. Residential property in the area at the north end of Industrial Avenue, would also be affected, however, potential damages would likely be limited to basement flooding and restricted access.

Strathcona Park to Sewage Lagoons (Figure 5, Sheet 9)

Flooding in this reach is generally restricted to developed parkland and other heavily wooded areas adjacent to the river.

Both Strathcona Park and Police Point Park lie within the flood risk area, as discussed above. On the other hand, the Medicine Hat Sewage Treatment Plant and Lagoons are protected by perimeter dikes,

which provide a minimum freeboard of about 1.0 m above the computed 1:100 year flood level in this reach.

The presently undeveloped Parkview subdivision, located on the west side of the river directly north of Police Point, is several metres above flood level.

Downstream of Sewage Lagoons (Figure 5, Sheets 10 to 14)

At the present time there is no urban development adjacent to the river downstream of the Medicine Hat Sewage Lagoons and most of the land situated in flood risk areas would fall into the broad category of marginal use bottom lands. A relatively small amount of land under cultivation is affected and no major structures or dwellings are known to be at risk.

As was the case with the area upstream of the Trans Canada Highway, the meandering course of the river in this reach results in a pattern of overbank flooding which generally shifts from one side of the channel to the other. Much of the flooding occurs on land situated on a the inside of major bends in the river.

4.5 Flood Risk Maps - Ross Creek and Seven Persons Creek

The flood risk maps for Ross Creek and Seven Persons Creek are discussed, beginning at the downstream end of the study reach (confluence region) and proceeding upstream.

4.5.1 Seven Persons Creek

East of Kingsway Avenue (Figure 6, Sheet 2)

A 1:100 year flood on Seven Persons Creek would result in extensive flooding in the South Flats district east of Kingsway Avenue. As was experienced during the 1952 spring flood, water would spill into the mainly residential area roughly bounded by 6th Street S.E. in the north, 12th Street S.E. in the south, Allowance Avenue in the east and Kingsway Avenue in the west. The depth of flooding would vary considerably in the areas affected. For example, buildings located near the outer fringe of the flooding would probably escape with minimal damages (i.e., water levels are expected to rise only slightly above street level). Residences or businesses located closer to Seven Persons Creek, however, are more likely to suffer basement flooding, and in some cases water levels could be expected to rise above the first floor level. Since Kingsway Avenue would be flooded between 8th Street and Spencer Street, access to the Dunmore Road bridge would be effectively cut off.

Widespread flooding would also occur in the industrial district north of Seven Persons Creek between Kingsway Avenue and the C.P.R. mainline. Several major industries would be affected, including Ogilvie Mills, Sherwood Packers, Medicine Hat Feeding Company and Hat Salvage. South Railway Street would be inundated for a distance of about 300 m with water levels reaching a maximum depth of about 0.8 m at the bridge over Seven Persons Creek. This would cut off access to the southeast along Carry Drive.

Downstream of the C.P.R. mainline, the extent of flooding would be less than would occur during a 1:100 year flood on the South Saskatchewan River (refer to Section 4.4). Even so, about a 150 m section of Industrial Avenue on the south side of Seven Persons Creek would be flooded over, limiting access to the Purmal subdivision. At least one major industry (Medicine Hat Wholesale Foods) would be surrounded by floodwaters and the railway spur line to the Medicine Hat Brick and Tile Company would be under about 0.5 m of water.

Kingsway Avenue to Kin Coulee Park (Figure 6, Sheet 3)

West of Kingsway Avenue most of the residences and businesses located along Spencer Street, Marshall Avenue and Kipling Street are within the 1:100 year flood risk zone. Also affected are some key city operated facilities, including the Municipal Services Building, Gas and Utilities, and the Transit Department. The depth of flooding would vary considerably in this area. In some locations water could be expected to reach the main floor level of buildings causing extensive damage, while in others, water may only surround the buildings, restricting access but causing minimal damage. Access along Kipling Street to College Drive and the the Maple Leaf Flour Mill would be severely restricted during a 1:100 year flood.

The east end of Kin Coulee Park would be flooded, as would the roadway into the park. This flooding is due largely to the constriction caused by the College Drive culverts, which are only capable of conveying about 75 to 80 percent of the 1:100 year discharge in Seven Persons Creek. Water would be backed up on the

west (upstream) side of the College Drive crossing, flooding the park on the south side of the channel and the area to the north of Kipling Street on the opposite side. Further into Kin Coulee Park flooding is mainly confined to the main channel and to an old abandoned channel which runs along the base of the north valley wall. The park access road would be under water as far as the newly constructed water supply weir, which would be totally submerged during a 1:100 year flood.

Upstream of Trans Canada Highway (Figure 6, Sheets 4 and 5)

Upstream of the Trans Canada Highway, the Seven Persons Creek valley narrows appreciably as does the 1:100 year flood risk zone which typically takes up much of the valley floor. There are no major crossings in this reach and no development has taken place, thus the potential for flood damages is minimal.

4.5.2 Ross Creek (Figure 6, Sheet 6)

Most of the Purmal subdivision is situated within the 1:100 year flood risk area. During a flood of this magnitude on Ross Creek, water would be flowing over the Porcelain Avenue Bridge leading to the Medicine Hat Brick and Tile Company. The most southerly of the two main buildings would be flooded, as would a large portion of the yard areas. Several residences between Porcelain Avenue and the Highway 41A bridge would be inundated with water reaching a depth of 1.0 m in some locations.

Upstream of Highway 41A, flooding would affect some of the farm buildings and feedlot facilities located in the narrow valley

bordering Ross Creek. The local access road in Se 28-12-5-W4 would also be inundated during a 1:100 year flood.

5.0 POTENTIAL FOR ICE JAMS

This floodplain study deals mainly with flooding under open water conditions. However, in an extreme climate such as exists in Alberta, the potential for ice jam related flooding is ever present and therefore should not be overlooked. The following sections are included to provide a perspective on the subject of ice jam flooding at Medicine Hat, particularly as it relates to the 1:100 year flood risk maps which are presented in this report.

5.1 South Saskatchewan River

The 1951 ice jam (see Section 2.0) provides positive evidence of the potential for ice jams of major proportions to occur on the South Saskatchewan River at Medicine Hat. Such an event, however, has to be considered extremely rare as no other major jam is known to have occurred at Medicine Hat during this century.

The maximum stage recorded during the 1951 ice jam was 8.5 m, which is considerably lower than the predicted 1:100 year open water flood stage of 9.8 m. Furthermore, with only one major ice jam flood having been recorded, it is not possible to carry out a frequency analysis to determine the return period for that event. To predict the stage corresponding to a theoretical 1:100 year ice jam flood a statistical analysis of recorded breakup stages at Medicine Hat (using W.S.C. records for Station No. 05AH001) would have to be performed. However, because the majority of years show relatively little deviation from the 'normal' stage at breakup, it was felt that such an analysis would not produce meaningful results.

In conclusion, it is inevitable that ice jams will occur on the South Saskatchewan River at Medicine Hat from time to time in the future. However, based on the available data the chances of an ice jam flood exceeding the 1:100 year open water flood levels appear to be very small.

5.2 Ross Creek and Seven Persons Creek

Since floods on the two tributary streams are most likely to occur during the spring breakup period (late March and early April), the potential for ice jams to form coincident with peak flows is considered high. This is especially true near the confluence with the South Saskatchewan River if the river ice is still intact when breakup occurs on the tributaries. Also, because of the many bridge and culvert crossings in the lower reaches of Ross Creek and Seven Persons Creek, the risk of ice jams forming is greatly increased. During both the 1951 and 1952 floods, ice jams were reported at some of the city and railway bridges in the South Flats district and Purmal subdivision. On at least one or two occasions, blasting was required to break up the jams which were backing water into residential and industrial areas.

Taking an extreme case where an ice jam occurs on Ross Creek or Seven Persons Creek during a 1:100 year flood (assuming the flood occurs during the spring breakup period), there is a chance that flooding upstream of the jam would extend beyond the limits delineated on the flood risk maps presented in this report. Technically speaking, this type of scenario would constitute a rarer

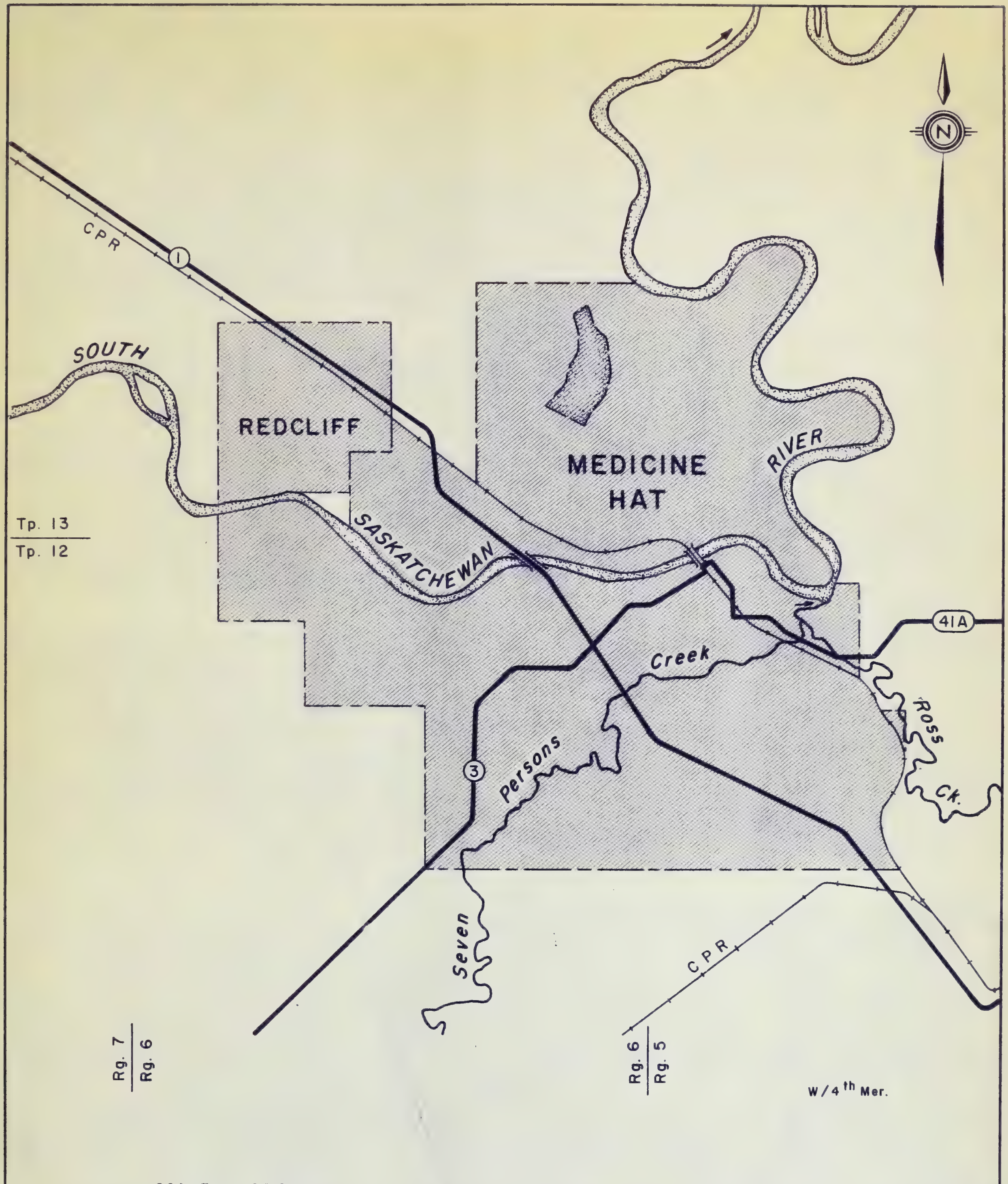
event than the same flood with no ice jam (i.e., it would have a return period greater than 100 years). The problem here lies in determining the true level of risk in a situation where high flows and ice jams can occur together. Unfortunately, the problem cannot be solved because of the inherent unpredictable nature of ice jams which generally do not lend themselves to statistical analysis. For the present time, the most reasonable approach is to accept the 1:100 year flood risk maps based on open water conditions while ensuring that ample freeboard is provided for new developments in areas where ice jams are most likely to occur.

REFERENCES

1. Canada Department of Northern Affairs and National Resources, "Flood of June 1953 in the South Saskatchewan River Basin", Water Resources Paper No. 113F, Ottawa.

2. Quazi et al, "Medicine Hat Floodplain Study - Main Report", Alberta Environment, Edmonton, May 1986.

3. U.S. Army Corps of Engineers, "HEC-2 Water Surface Profile Users Manual", Hydrologic Engineering Centre, Davis, California, January 1981.


CPR
1
SOUTH
SASKATCHEWAN
RIVER
REDCLIFF
MEDICINE HAT
N
41A
Creek
Persons
Ross Ck.
3
Seven
CPR
Tp. 13
Tp. 12
Rg. 7
Rg. 6
Rg. 6
Rg. 5
W/4th Mer.

SCALE 1:100 000

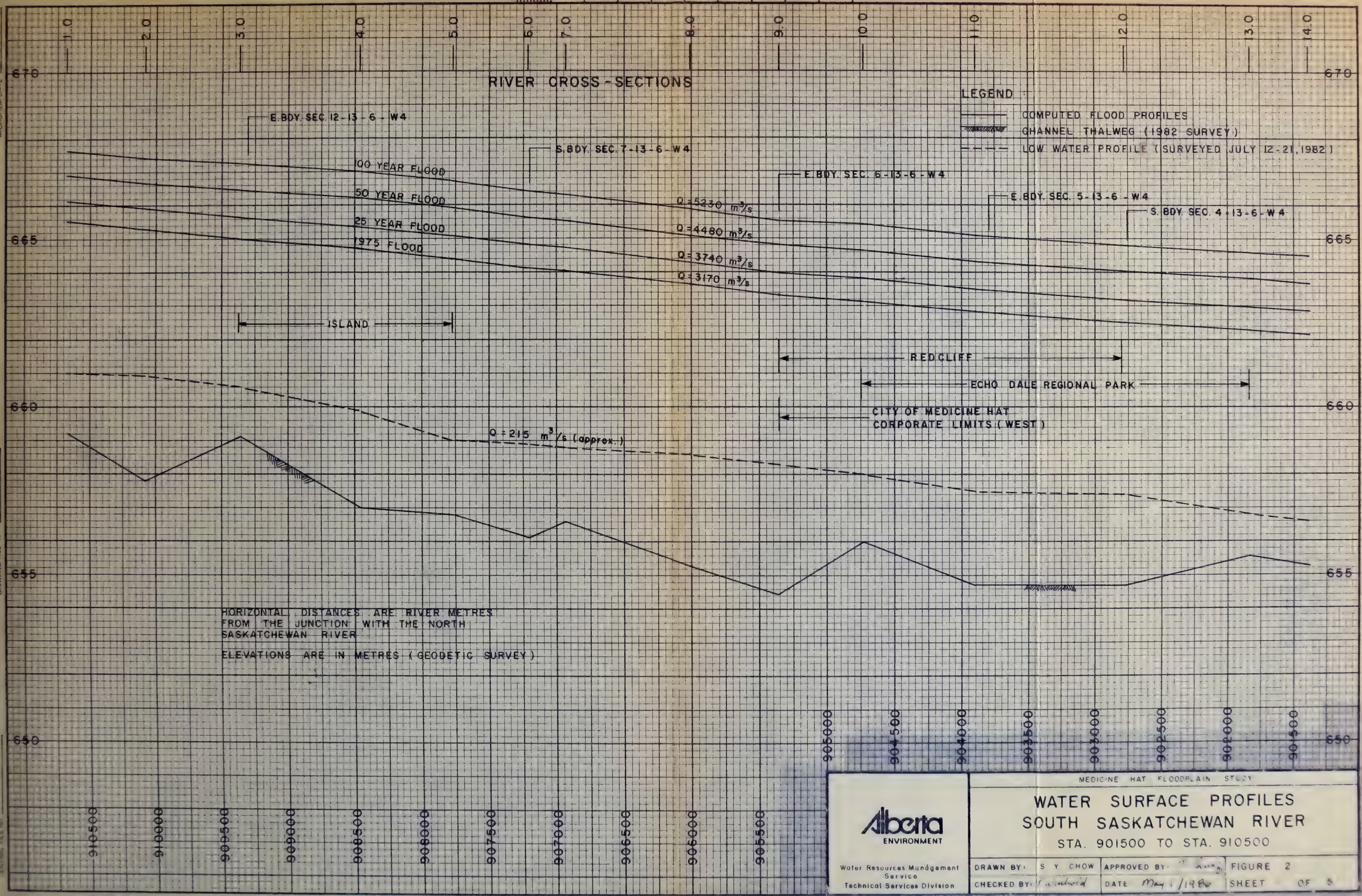
Alberta
ENVIRONMENT
Water Resources Management Service
Technical Services Division

MEDICINE HAT FLOODPLAIN STUDY

STUDY AREA

DRAWN BY: B. Sanders
APPROVED BY: M. Quazi
CHECKED BY: T. Winhold
DATE: May 1/86

FIGURE No. 1



MEDICINE HAT FLOODPLAIN STUDY

WATER SURFACE PROFILES
SOUTH SASKATCHEWAN RIVER
STA. 901500 TO STA. 910500

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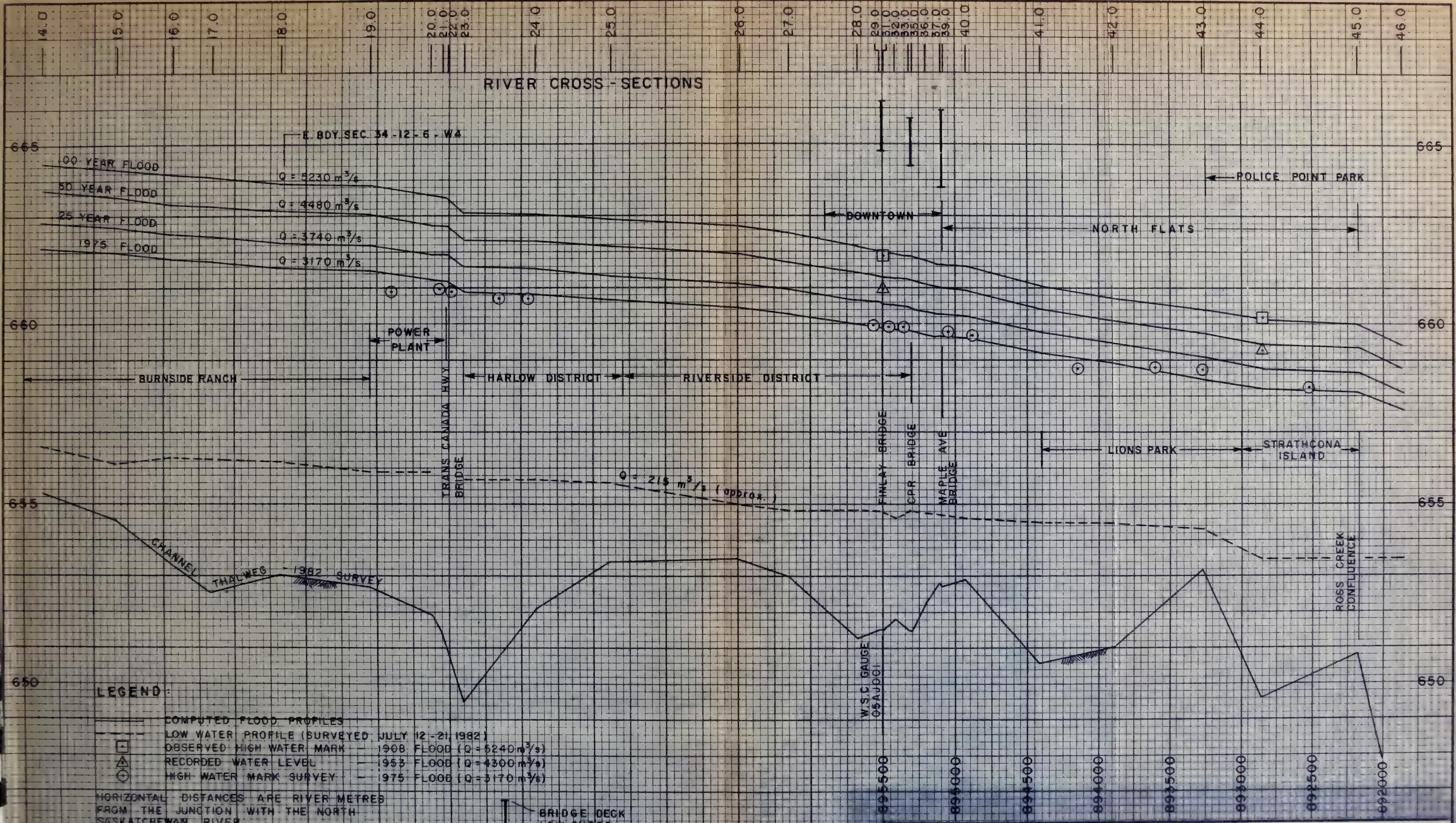
ENVIRONMENT

Water Resources Management Service
Technical Services Division

DRAWN BY: S Y CHOW	APPROVED BY:	FIGURE 2
CHECKED BY:	DATE May, /1986	SHEET OF 5



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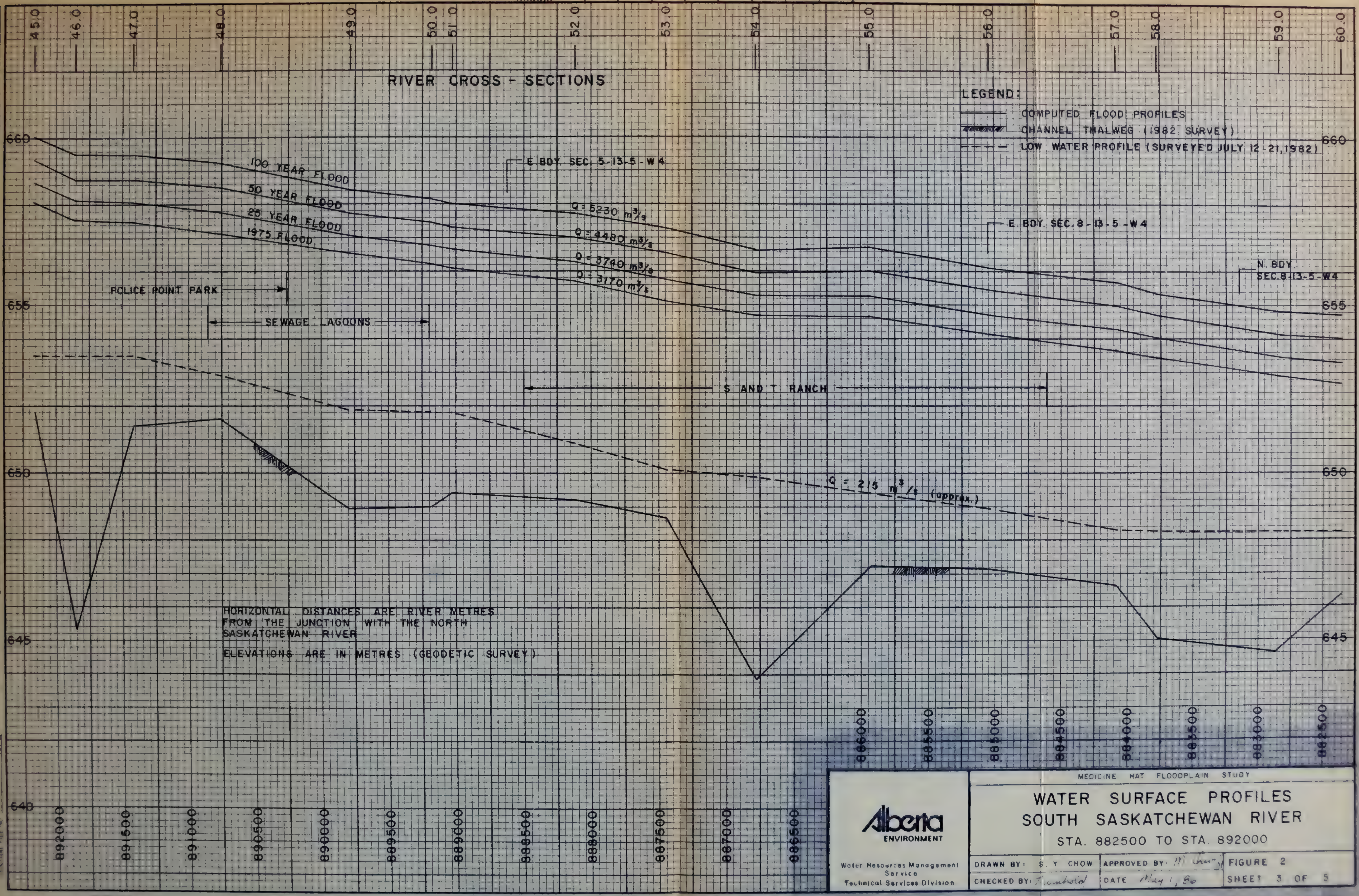
MEDICINE HAT FLOODPLAIN STUDY

WATER SURFACE PROFILES
SOUTH SASKATCHEWAN RIVER

STA. 892000 TO STA. 901500

DRAWN BY: S. Y. CHOW	APPROVED BY:	FIGURE 2
CHECKED BY:	DATE:	SHEET 2 OF 5



MEDICINE HAT FLOODPLAIN STUDY

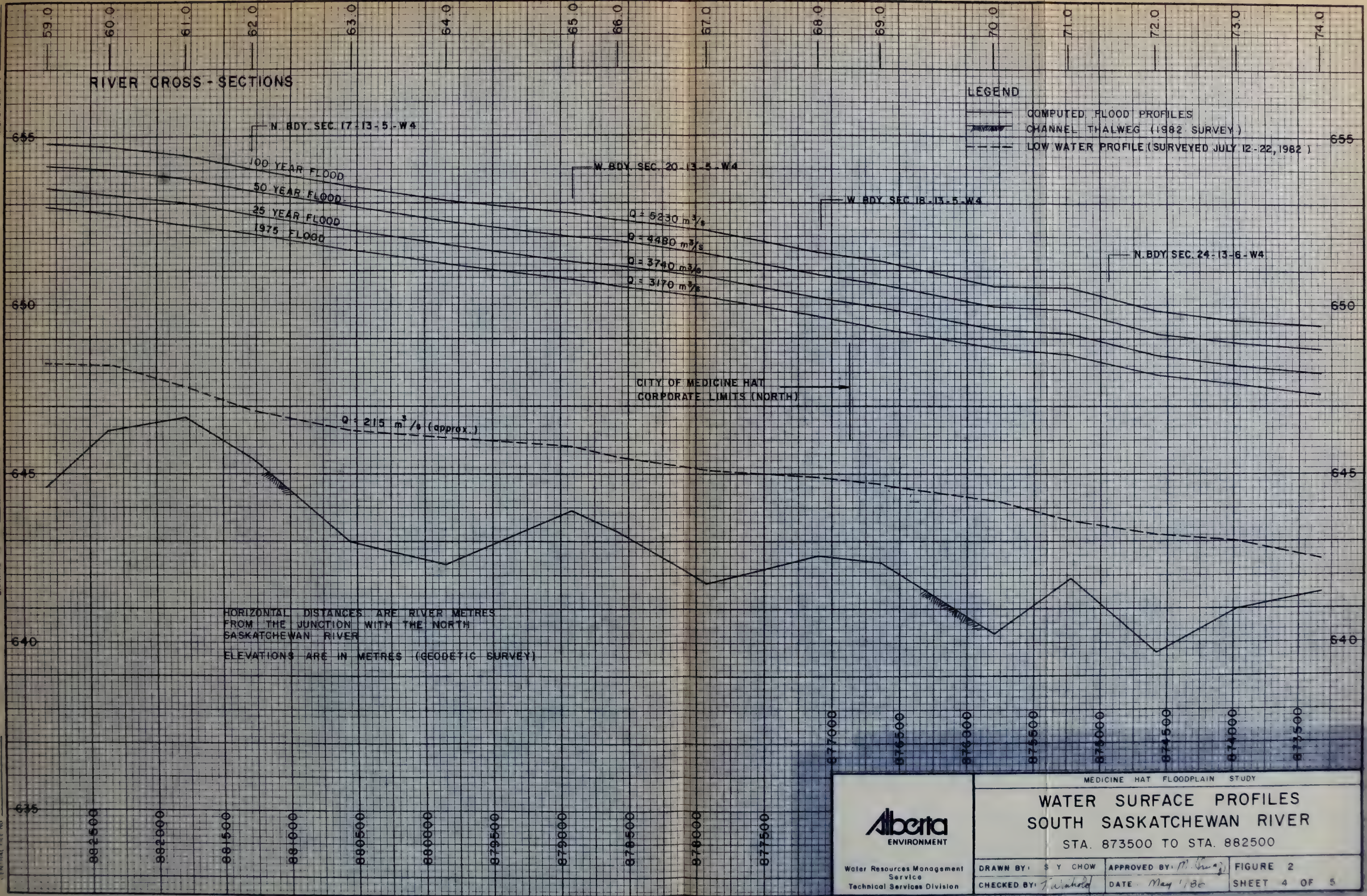
WATER SURFACE PROFILES
SOUTH SASKATCHEWAN RIVER

STA. 882500 TO STA. 892000

Alberta ENVIRONMENT

Water Resources Management Service
Technical Services Division

DRAWN BY: S. Y. CHOW	APPROVED BY:	FIGURE 2
CHECKED BY:	DATE May 1, 86	SHEET 3 OF 5



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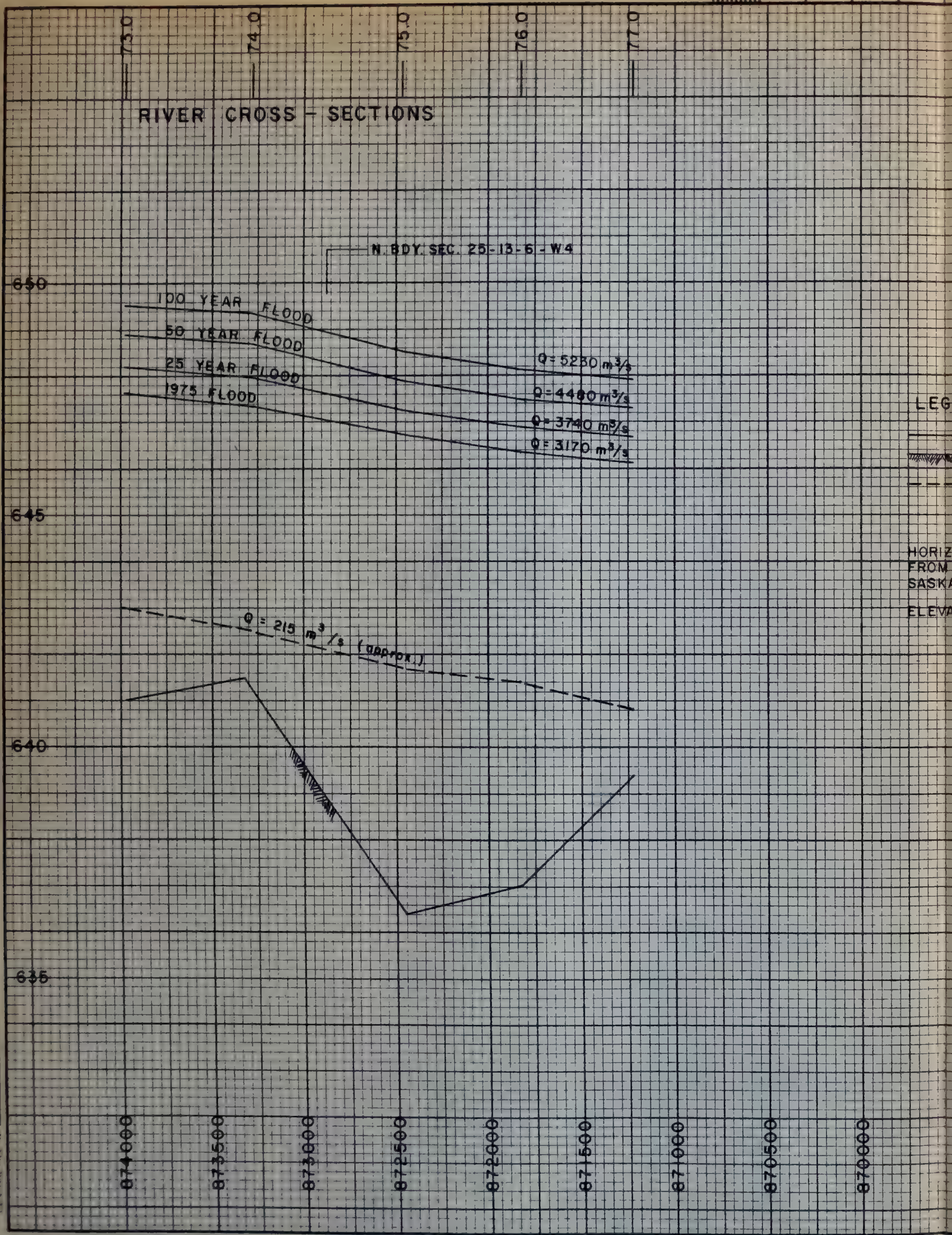
MEDICINE HAT FLOODPLAIN STUDY

WATER SURFACE PROFILES
SOUTH SASKATCHEWAN RIVER

STA. 873500 TO STA. 882500

DRAWN BY: S Y CHOW	APPROVED BY: M. Chow	FIGURE 2
CHECKED BY: T. Wiehold	DATE May '86	SHEET 4 OF 5



LEGEND :

———	COMPUTED FLOOD PROFILES
▨▨▨	CHANNEL THALWEG (1982 SURVEY)
– – – –	LOW WATER PROFILE (SURVEYED JULY 12-21, 1982)

HORIZONTAL DISTANCES ARE RIVER METRES FROM THE JUNCTION WITH THE NORTH SASKATCHEWAN RIVER

ELEVATIONS ARE IN METRES (GEODETIC SURVEY)

650

645

640

635

MICROFILM DATE

DRAWING FILE No

CENTRAL FILE No

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MEDICINE HAT FLOODPLAIN STUDY

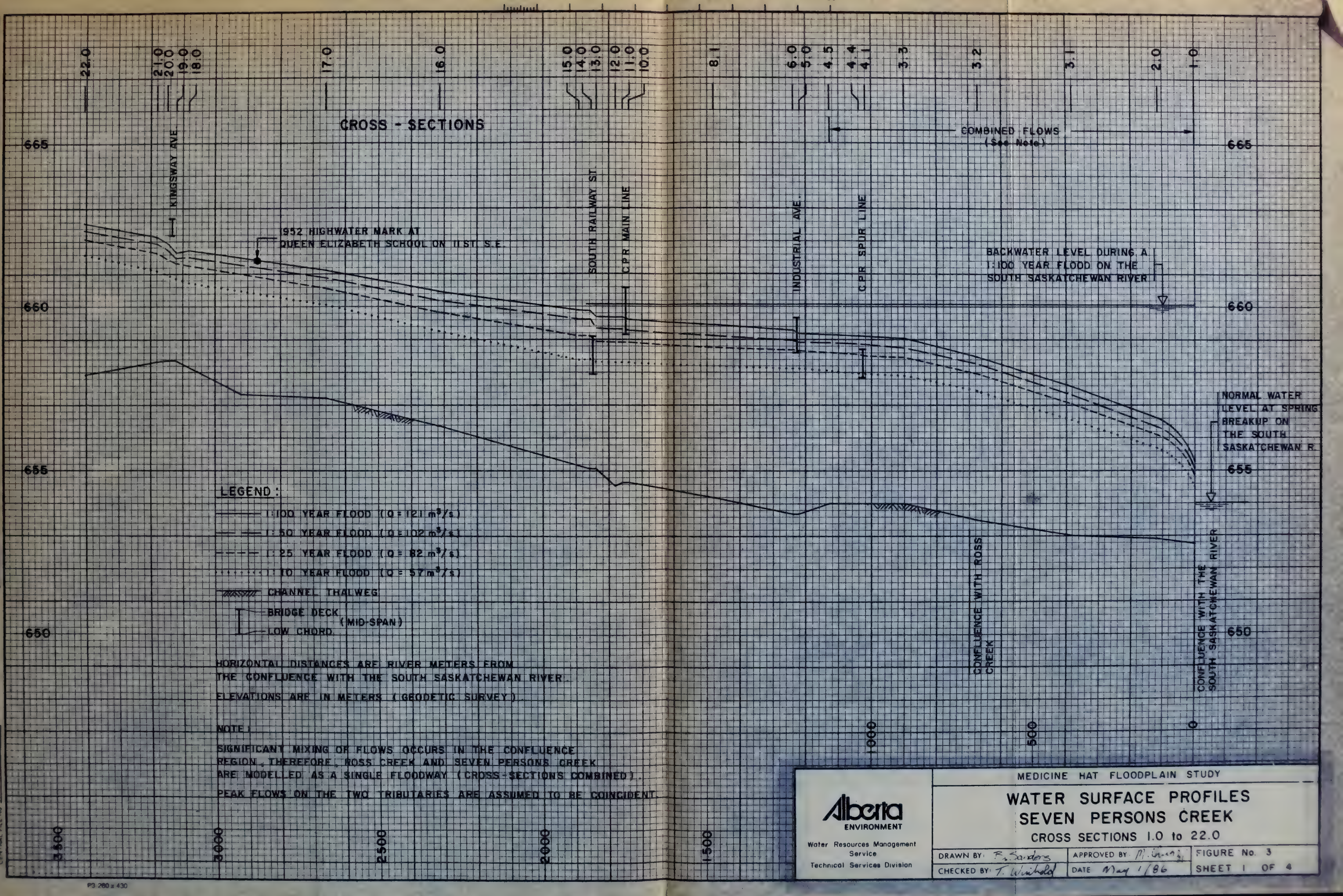
WATER SURFACE PROFILES
SOUTH SASKATCHEWAN RIVER

STA. 870000 TO STA. 874000

DRAWN BY: S Y CHOW	APPROVED BY:	FIGURE 2
CHECKED BY: T Winhold	DATE May 1/86	SHEET 5 OF 5

P3-280 x 430

MICROFILM DATE



LEGEND:

- ——— 1:100 YEAR FLOOD (Q = 121 m³/s)
- — — 1:50 YEAR FLOOD (Q = 102 m³/s)
- - - - 1:25 YEAR FLOOD (Q = 82 m³/s)
- ⋯⋯ 1:10 YEAR FLOOD (Q = 57 m³/s)
- ▨ CHANNEL THALWEG
- BRIDGE DECK / LOW CHORD (MID-SPAN)

HORIZONTAL DISTANCES ARE RIVER METERS FROM THE CONFLUENCE WITH THE SOUTH SASKATCHEWAN RIVER.

ELEVATIONS ARE IN METERS (GEODETIC SURVEY).

NOTE:

SIGNIFICANT MIXING OF FLOWS OCCURS IN THE CONFLUENCE REGION, THEREFORE, ROSS CREEK AND SEVEN PERSONS CREEK ARE MODELLED AS A SINGLE FLOODWAY (CROSS-SECTIONS COMBINED).

PEAK FLOWS ON THE TWO TRIBUTARIES ARE ASSUMED TO BE COINCIDENT.

DRAWING FILE No.

CENTRAL FILE No.

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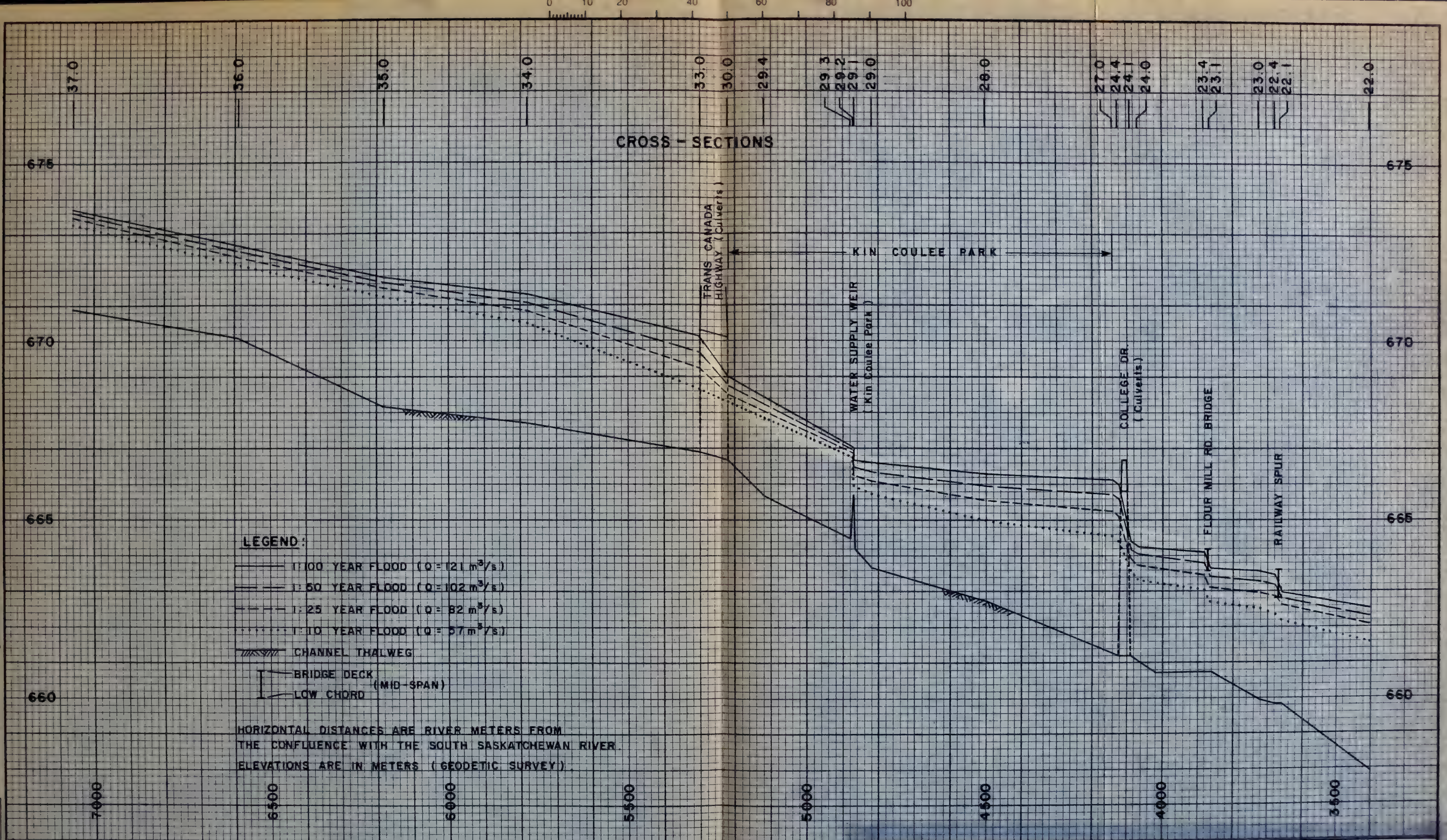
MEDICINE HAT FLOODPLAIN STUDY

WATER SURFACE PROFILES
SEVEN PERSONS CREEK

CROSS SECTIONS 1.0 to 22.0

DRAWN BY: R. Sanders	APPROVED BY:	FIGURE No. 3
CHECKED BY: T. Withold	DATE May 1/86	SHEET 1 OF 4

P3 280 x 430



HORIZONTAL DISTANCES ARE RIVER METERS FROM THE CONFLUENCE WITH THE SOUTH SASKATCHEWAN RIVER.

ELEVATIONS ARE IN METERS (GEODETIC SURVEY).

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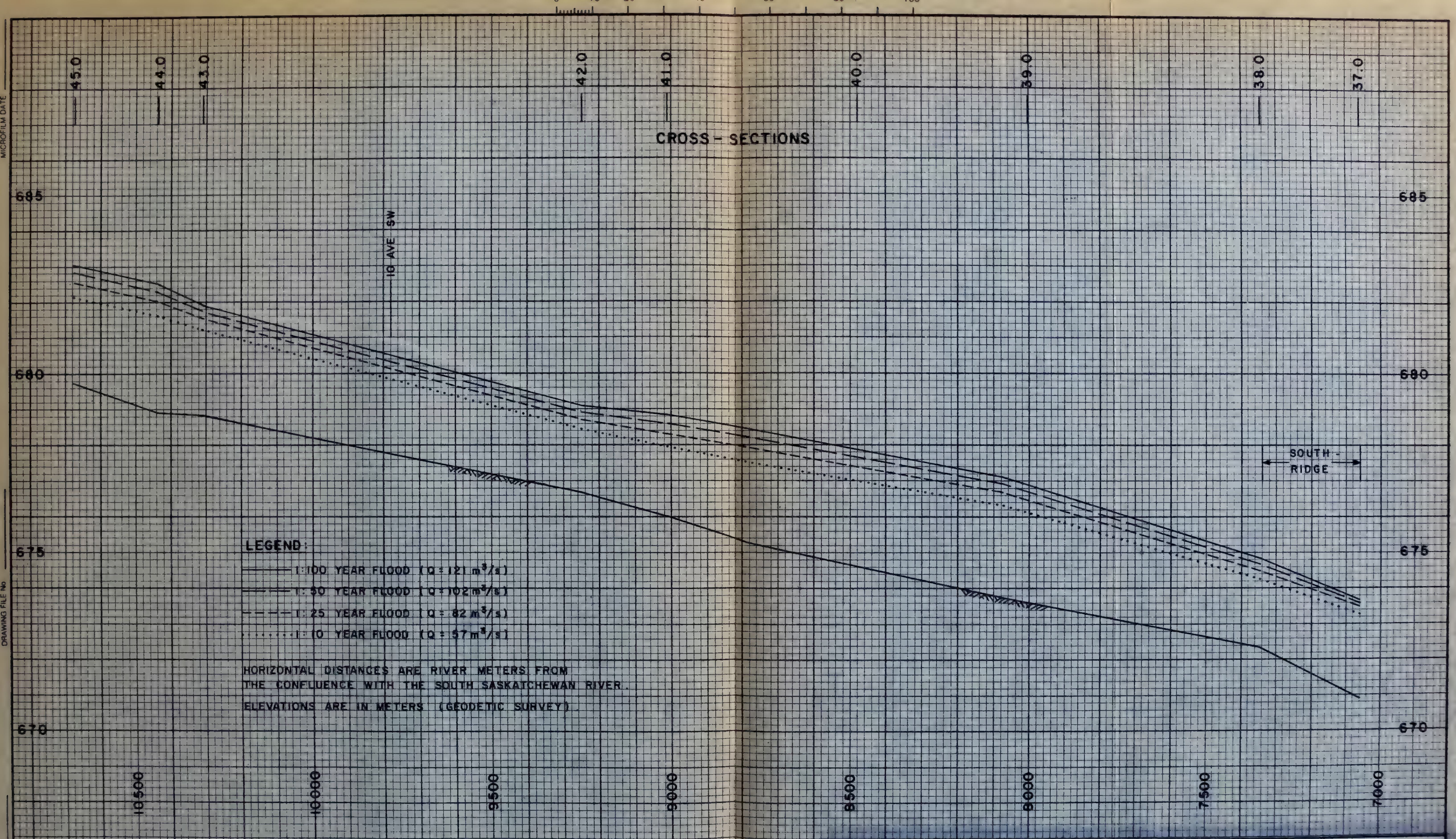
MEDICINE HAT FLOODPLAIN STUDY

WATER SURFACE PROFILES
SEVEN PERSONS CREEK

CROSS SECTIONS 22.0 to 37.0

DRAWN BY: B. Sanders	APPROVED BY: M. [illegible]	FIGURE No. 3
CHECKED BY: T. Winkold	DATE: May 1/86	SHEET 2 OF 4

P3-280 x 430



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Technical Services Division

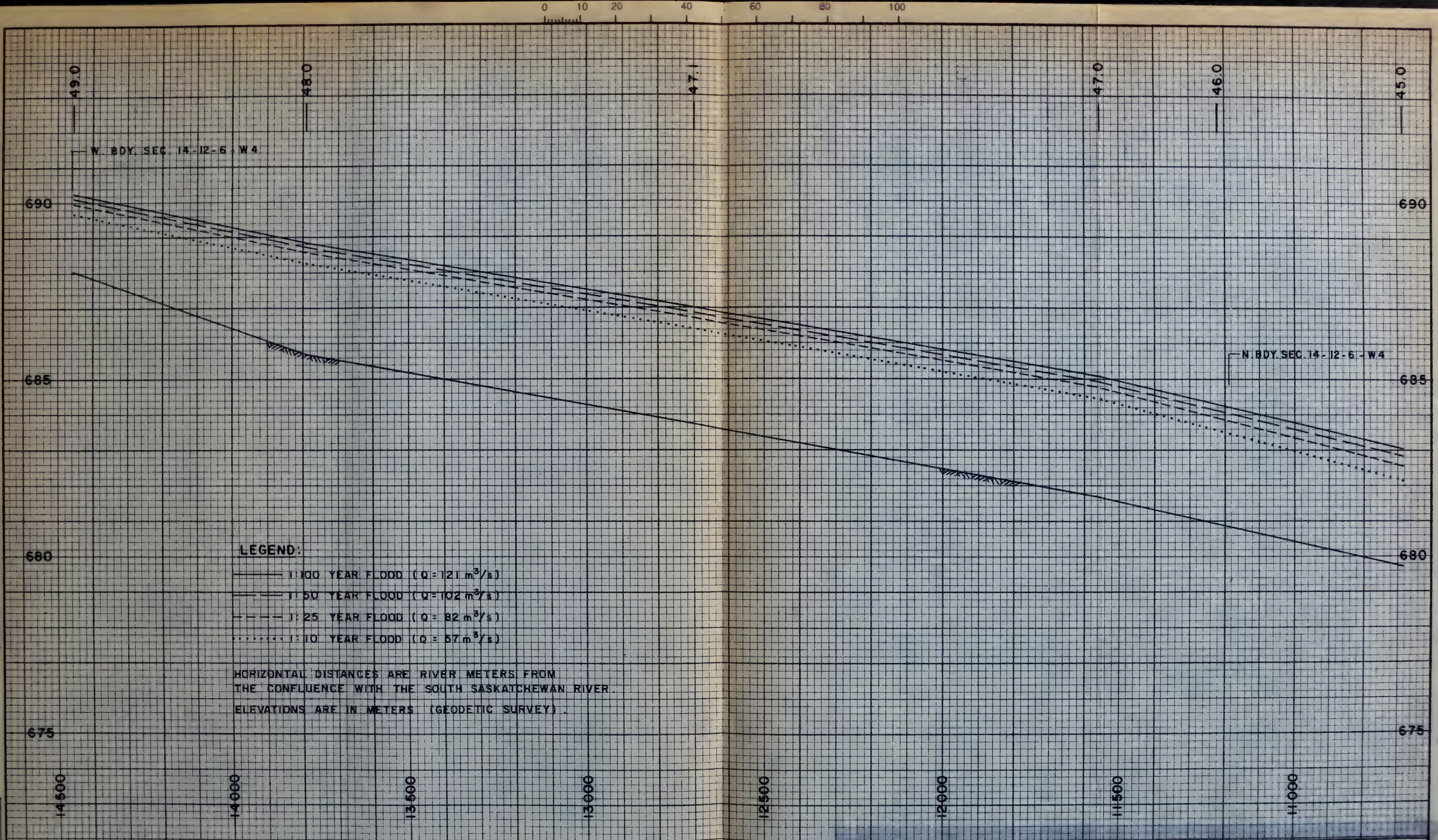
MEDICINE HAT FLOODPLAIN STUDY

WATER SURFACE PROFILES
SEVEN PERSONS CREEK

CROSS SECTIONS 37.0 to 45.0

DRAWN BY: B. Sanders
APPROVED BY: M. [illegible]
FIGURE No. 3
CHECKED BY: T. Winhold
DATE: May 1/86
SHEET 3 OF 4

MICROFILM DATE
DRAWING FILE No
CENTRAL FILE NO
P3 280 x 430



HORIZONTAL DISTANCES ARE RIVER METERS FROM THE CONFLUENCE WITH THE SOUTH SASKATCHEWAN RIVER.

ELEVATIONS ARE IN METERS (GEODETIC SURVEY).

MICROFILM DATE

DRAWING FILE No

CENTRAL FILE No

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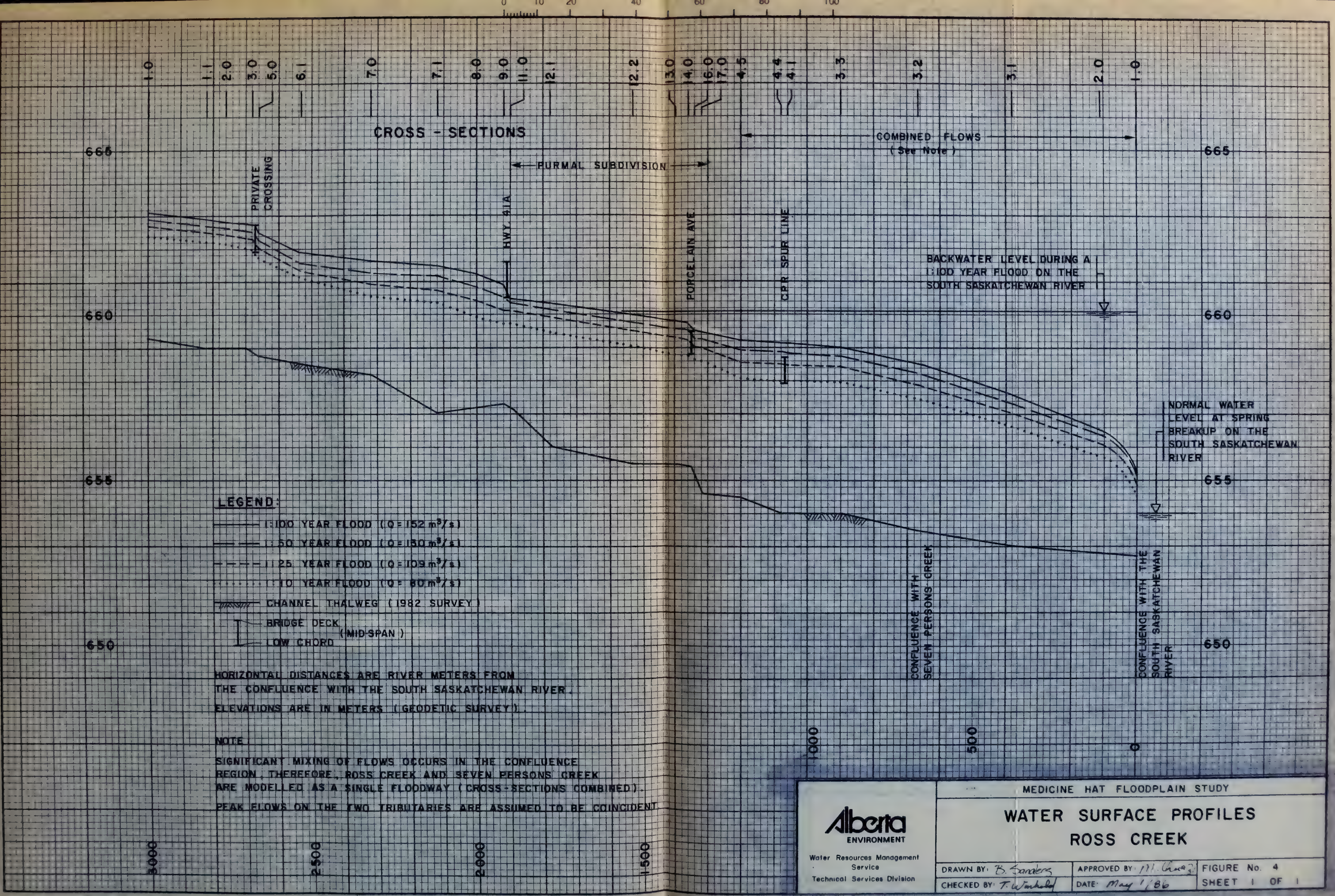
MEDICINE HAT FLOODPLAIN STUDY

WATER SURFACE PROFILES
SEVEN PERSONS CREEK

CROSS SECTIONS 45.0 to 49.0

DRAWN BY B. Sanders	APPROVED BY M. Chua 31	FIGURE No 3
CHECKED BY T. Winhold	DATE May 1/86	SHEET 4 OF 4

P3 280 x 430



HORIZONTAL DISTANCES ARE RIVER METERS FROM THE CONFLUENCE WITH THE SOUTH SASKATCHEWAN RIVER.

ELEVATIONS ARE IN METERS (GEODETIC SURVEY).

NOTE:

SIGNIFICANT MIXING OF FLOWS OCCURS IN THE CONFLUENCE REGION, THEREFORE, ROSS CREEK AND SEVEN PERSONS CREEK ARE MODELLED AS A SINGLE FLOODWAY (CROSS-SECTIONS COMBINED).

PEAK FLOWS ON THE TWO TRIBUTARIES ARE ASSUMED TO BE COINCIDENT.

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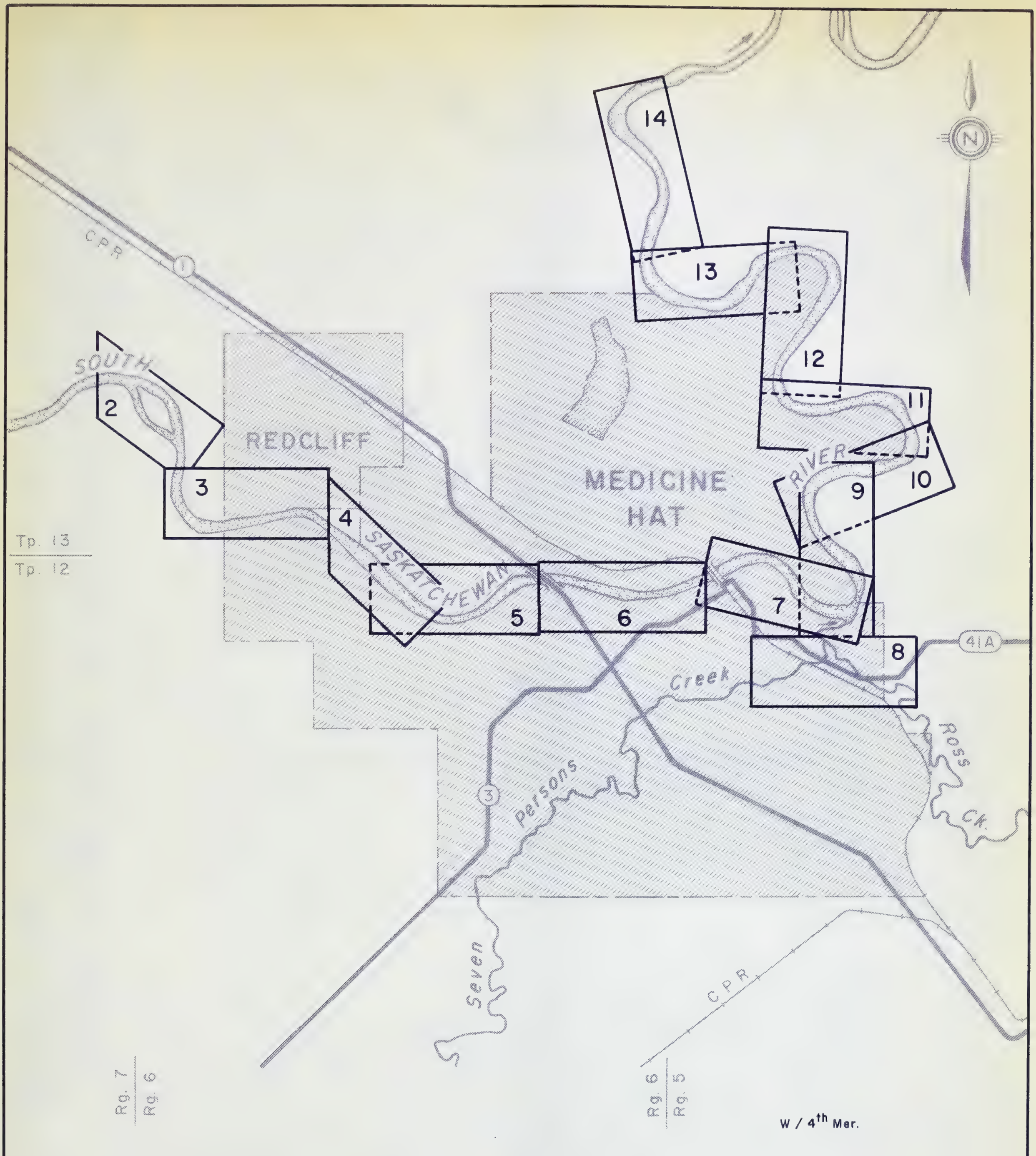
MEDICINE HAT FLOODPLAIN STUDY

WATER SURFACE PROFILES
ROSS CREEK

DRAWN BY: B. Sanders	APPROVED BY: M. Chac	FIGURE No. 4
CHECKED BY: T. Winhold	DATE: May 1/86	SHEET 1 OF 1


N
CPR
1
SOUTH
2
3
REDCLIFF
4
SASKATCHEWAN
5
6
MEDICINE HAT
14
13
12
11
RIVER
9
10
7
8
41A
Creek
Ross Ck.
3
Persons
Seven
CPR
Tp. 13
Tp. 12
Rg. 7
Rg. 6
Rg. 6
Rg. 5
W / 4th Mer.

SCALE 1:100 000

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ENVIRONMENT
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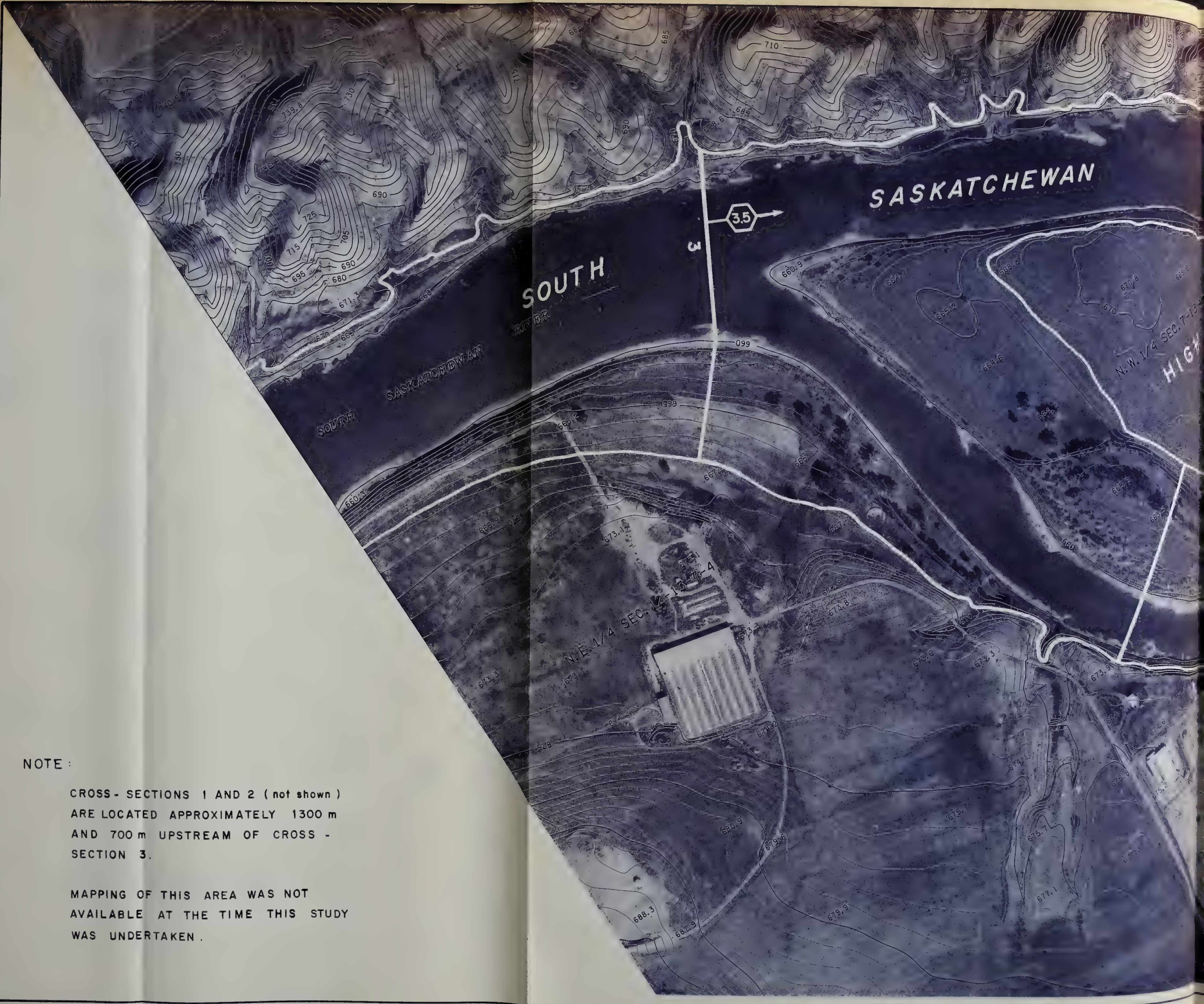
MEDICINE HAT FLOODPLAIN STUDY

FLOOD RISK MAPS – INDEX PLAN
SOUTH SASKATCHEWAN RIVER

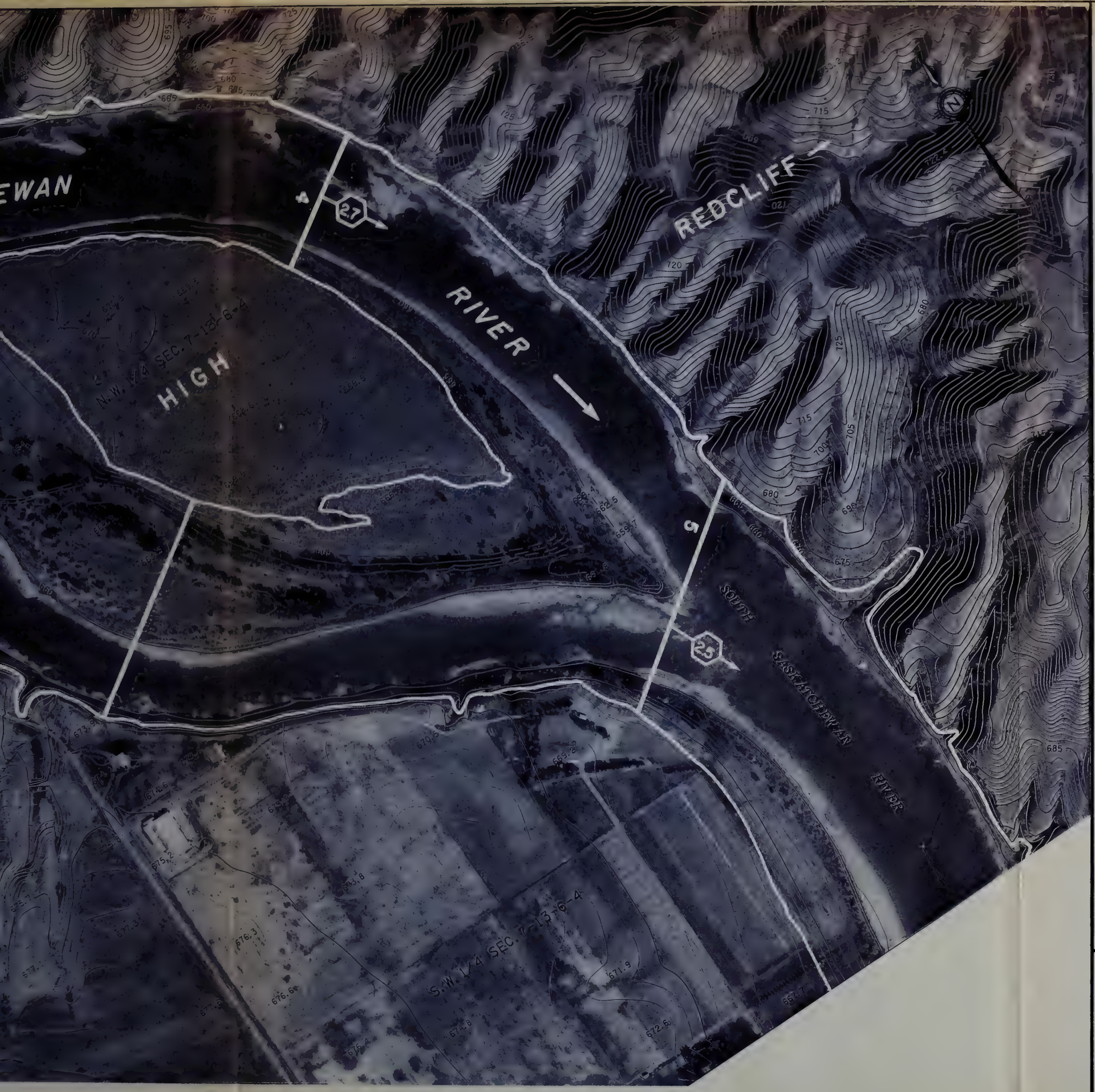
DRAWN BY : B. Sanders	APPROVED BY : M. Quazi	FIGURE No. 5
CHECKED BY : T. Winhold	DATE : May 1 /86	SHEET 1 OF 14


SOUTH SASKATCHEWAN
SOUTH SASKATCHEWAN RIVER
3
3.5
N.E. 1/4 SEC.
N.W. 1/4 SEC. 7-13-
HIG

NOTE:

CROSS-SECTIONS 1 AND 2 (not shown) ARE LOCATED APPROXIMATELY 1300 m AND 700 m UPSTREAM OF CROSS-SECTION 3.

MAPPING OF THIS AREA WAS NOT AVAILABLE AT THE TIME THIS STUDY WAS UNDERTAKEN.


EWAN
REDCLIFF
RIVER
HIGH
N.W. 1/4 SEC. 7-13-6-4
27
4
5
25
SOUTH SASKATCHEWAN RIVER
S.W. 1/4 SEC. 7-13-6-4
N
725
715
720
705
700
690
685
680
675

Water Resources

LEGEND

16 3.7

1:100 YEAR FLOOD RISK LIMITS

CROSS-SECTION LOCATION AND NUMBER

MEAN CHANNEL VELOCITY (m/s)
FOR A 1:100 YEAR FLOOD

0 100 200 300 400 500 m

SCALE 1:5000

* BASE MAPPING PRODUCED BY THE ALBERTA BUREAU OF SURVEYING AND MAPPING, 1984.

ORTHOPHOTO	SEPTEMBER, 1983
CONTOUR INTERVAL	1.0 metre

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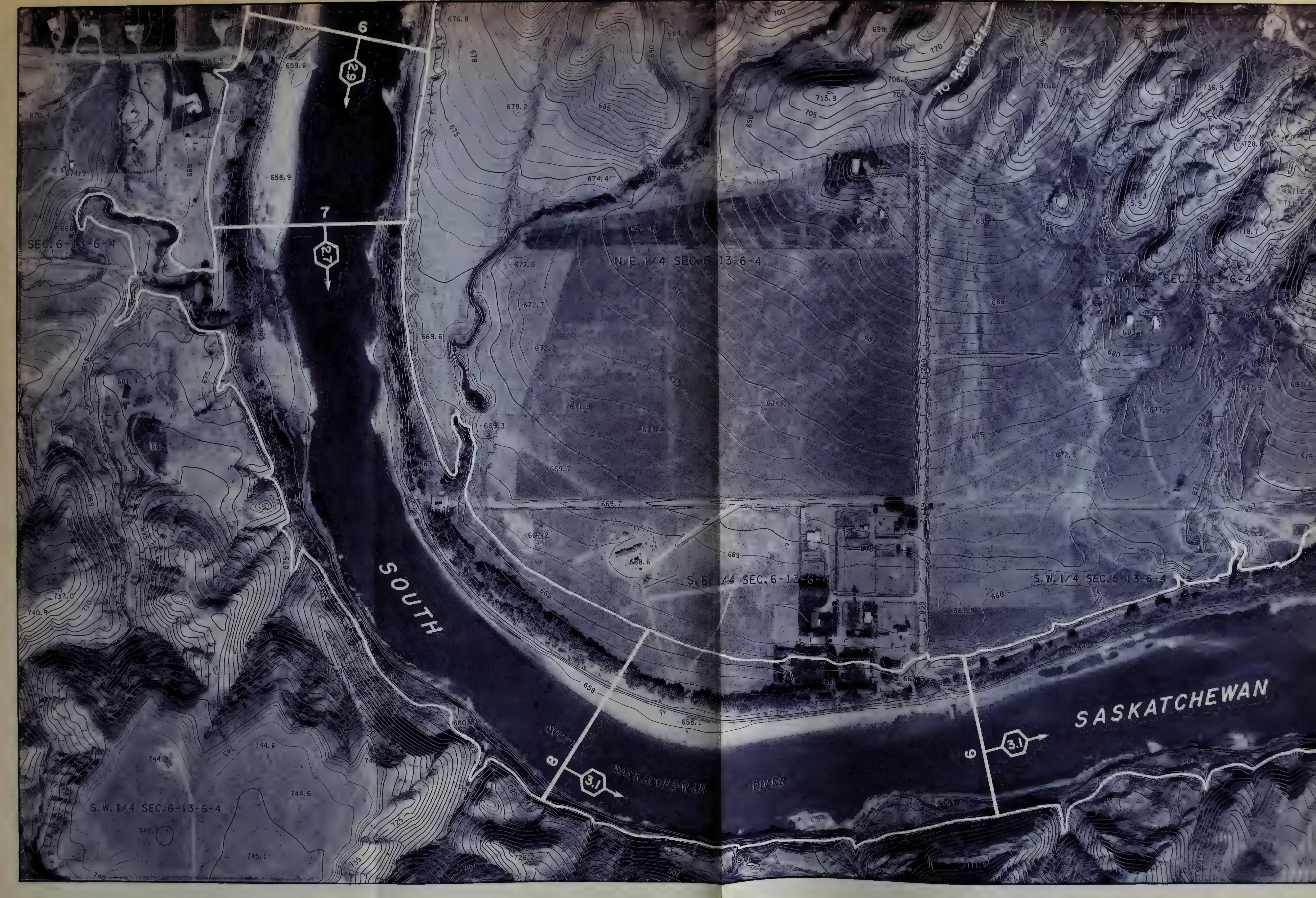
ENVIRONMENT

Water Resources Management
Service
Technical Services Division

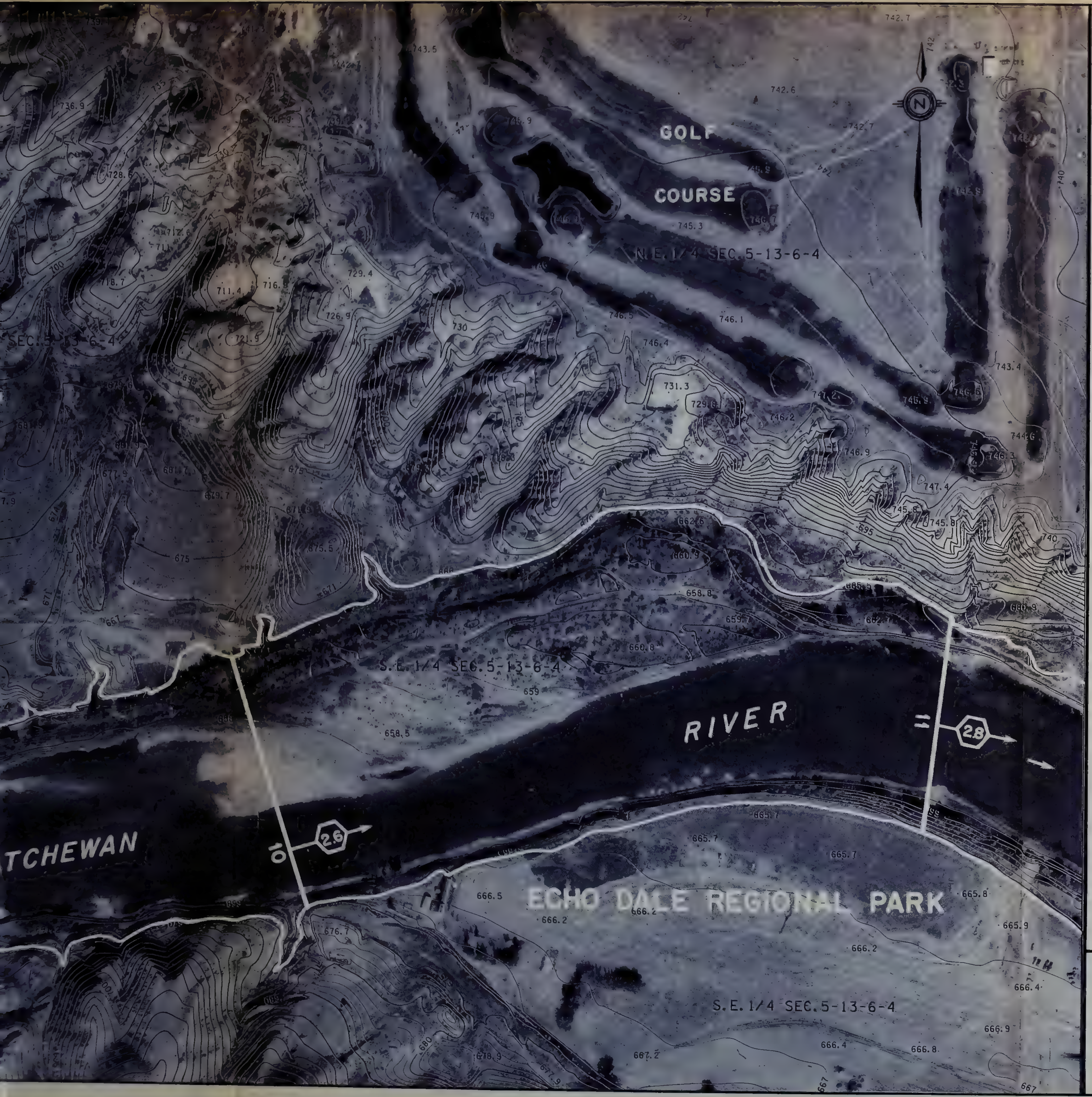
MEDICINE HAT FLOODPLAIN STUDY

FLOOD RISK MAP – SOUTH SASKATCHEWAN RIVER

DRAWN BY: E. Bernhauser
CHECKED BY: T. Winhold
APPROVED BY: M. Chu
DATE: May 1/86
FIGURE 5
SHEET 2 OF 14



6
2.9
7
2.7
8
3.1
6
3.1
TO REDCLIFF
SEC.6-13-6-4
N.E.1/4 SEC.6-13-6-4
N.W.1/4 SEC.5-13-6-4
S.E.1/4 SEC.6-13-6-4
S.W.1/4 SEC.5-13-6-4
S.W.1/4 SEC.6-13-6-4
SOUTH
SASKATCHEWAN
SOUTH SASKATCHEWAN RIVER


GOLF
COURSE
N.E. 1/4 SEC.5-13-6-4
SEC.5-13-6-4
S.E. 1/4 SEC.5-13-6-4
RIVER
TCHEWAN
ECHO DALE REGIONAL PARK
S.E. 1/4 SEC.5-13-6-4
N
10
2.6
2.8
742.7
743.5
742.6
745.9
745.3
746.1
746.4
746.2
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747.4
745.8
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744.6
746.3
736.9
728.6
729.4
726.9
716.8
711.4
718.7
721.9
731.3
729.8
730
675
660.9
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658.8
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659
658.5
665.7
665.8
665.9
666.2
666.4
666.5
666.8
666.9
667.2
676.7
678.9
680.9

Water Resources

LEGEND

▭	1:100 YEAR FLOOD RISK LIMITS
16	CROSS-SECTION LOCATION AND NUMBER
3.7	MEAN CHANNEL VELOCITY (m/s) FOR A 1:100 YEAR FLOOD

0 100 200 300 400 500 m

SCALE 1:5000

* BASE MAPPING PRODUCED BY THE ALBERTA BUREAU OF SURVEYING AND MAPPING, 1984.

ORTHOPHOTO	SEPTEMBER, 1983
CONTOUR INTERVAL	1.0 metre

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ENVIRONMENT

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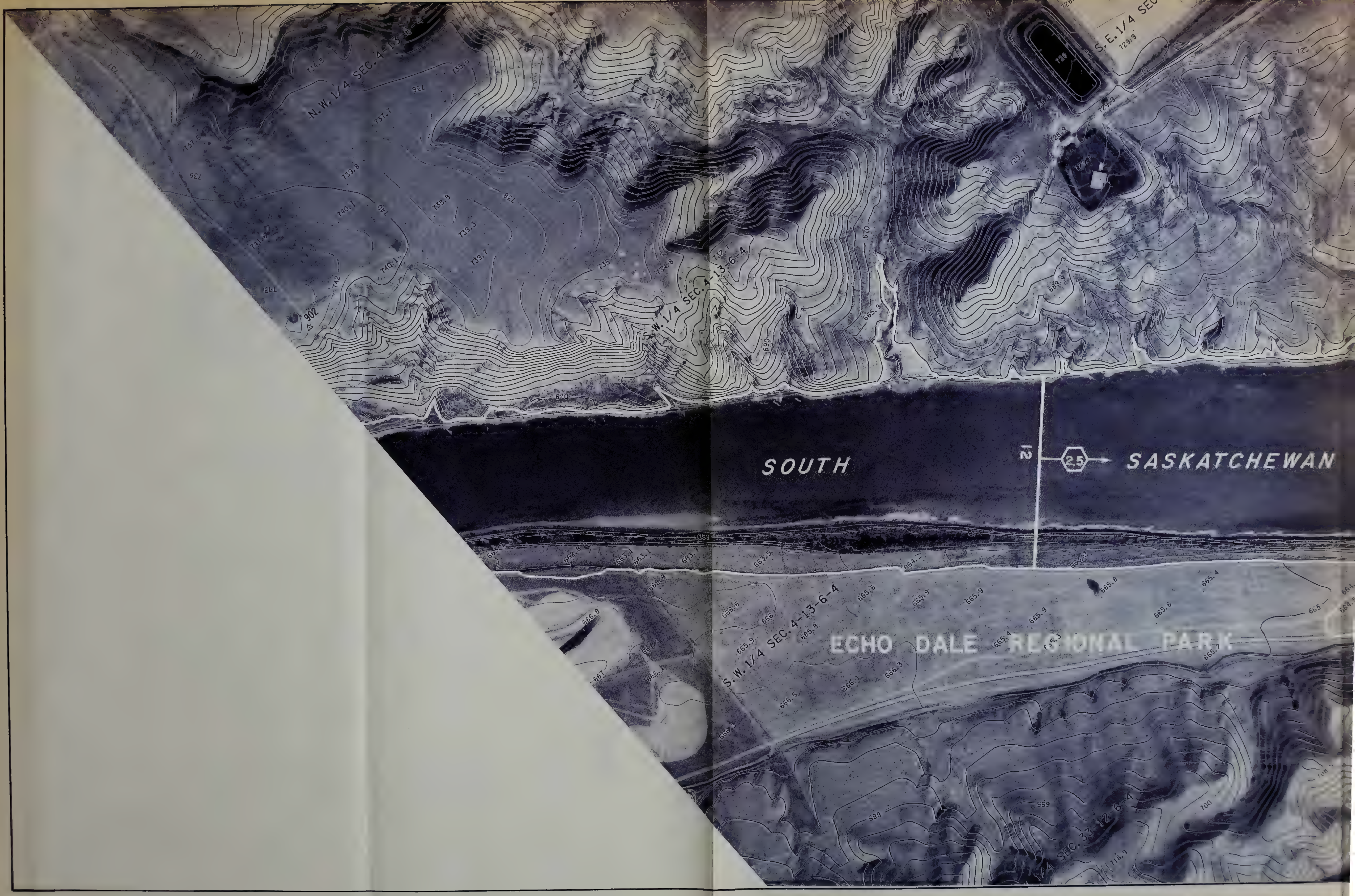
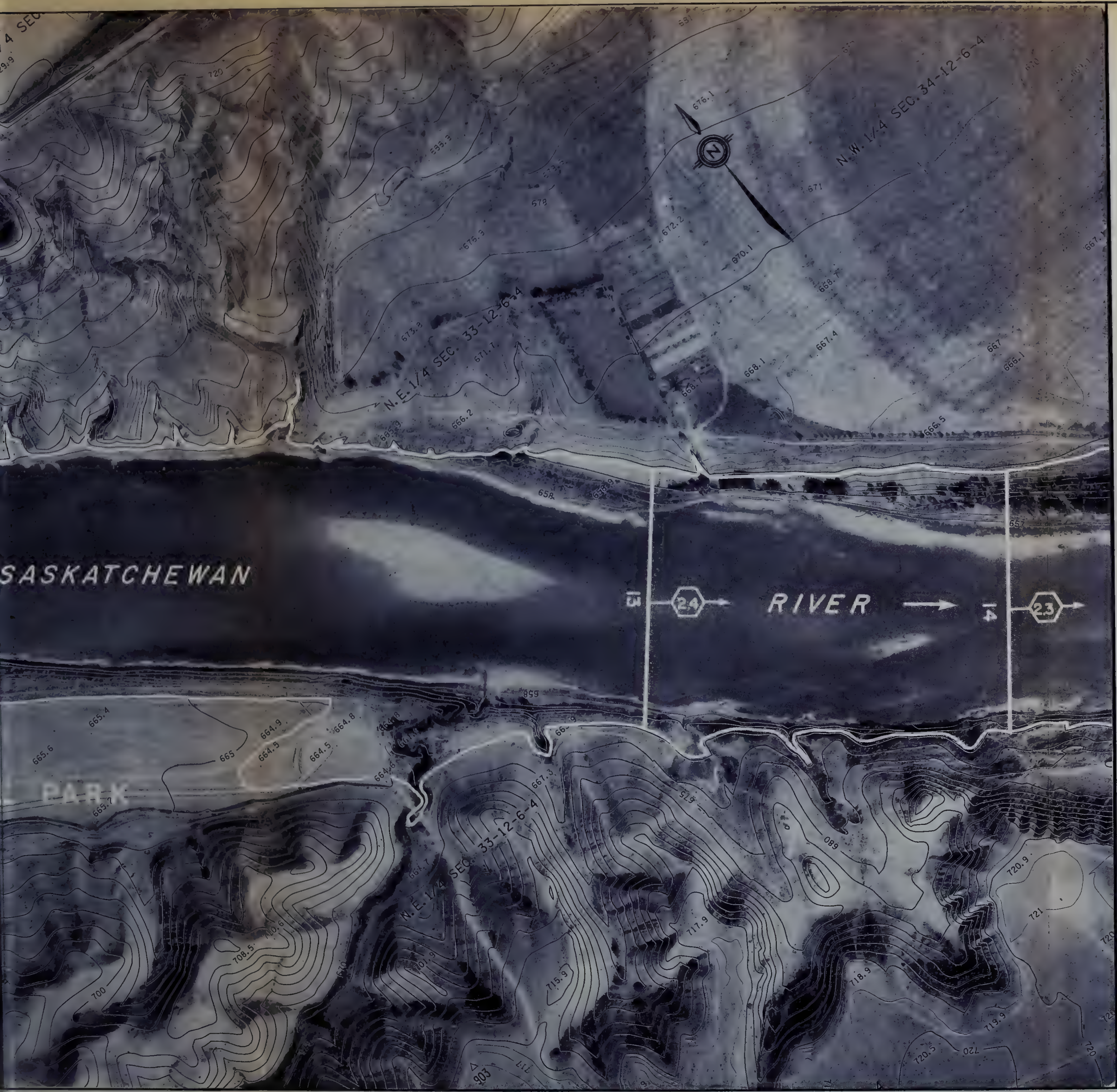
Technical Services Division

MEDICINE HAT FLOODPLAIN STUDY

FLOOD RISK MAP – SOUTH SASKATCHEWAN RIVER

DRAWN BY: E. Dumhauser	APPROVED BY: M. Quazi	FIGURE 5
CHECKED BY: T. Wunhold	DATE: May 1/86	SHEET 3 OF 14


N.W.1/4 SEC.4-13-6-4
S.E.1/4 SEC
S.W.1/4 SEC.4-13-6-4
902
SOUTH
12
2.5
SASKATCHEWAN
S.W.1/4 SEC.4-13-6-4
ECHO DALE REGIONAL PARK
SEC.33-12-6-4


S.E. 1/4 SEC.
N.W. 1/4 SEC. 34-12-6-4
N.E. 1/4 SEC. 33-12-6-4
SASKATCHEWAN
RIVER
13
2.4
14
2.3
PARK
N.E. 1/4 SEC. 33-12-6-4
676.1
672.2
670.1
671
668.7
667.4
668.1
667
666.1
666.5
673.8
671.1
666.2
665.9
658
657
659
665.4
665.6
665
664.9
664.5
664.8
663.7
667.3
717.9
715.3
708.5
700
720.9
721
719.9
720.5
720
903

Water Resources

LEGEND

1:100 YEAR FLOOD RISK LIMITS

16 CROSS-SECTION LOCATION AND NUMBER

3.7 MEAN CHANNEL VELOCITY (m/s) FOR A 1:100 YEAR FLOOD

0 100 200 300 400 500 m

SCALE 1:5000

* BASE MAPPING PRODUCED BY THE ALBERTA BUREAU OF SURVEYING AND MAPPING, 1984.

ORTHOPHOTO	SEPTEMBER, 1983
CONTOUR INTERVAL	1.0 metre

MEDICINE HAT FLOODPLAIN STUDY

FLOOD RISK MAP — SOUTH SASKATCHEWAN RIVER

Alberta
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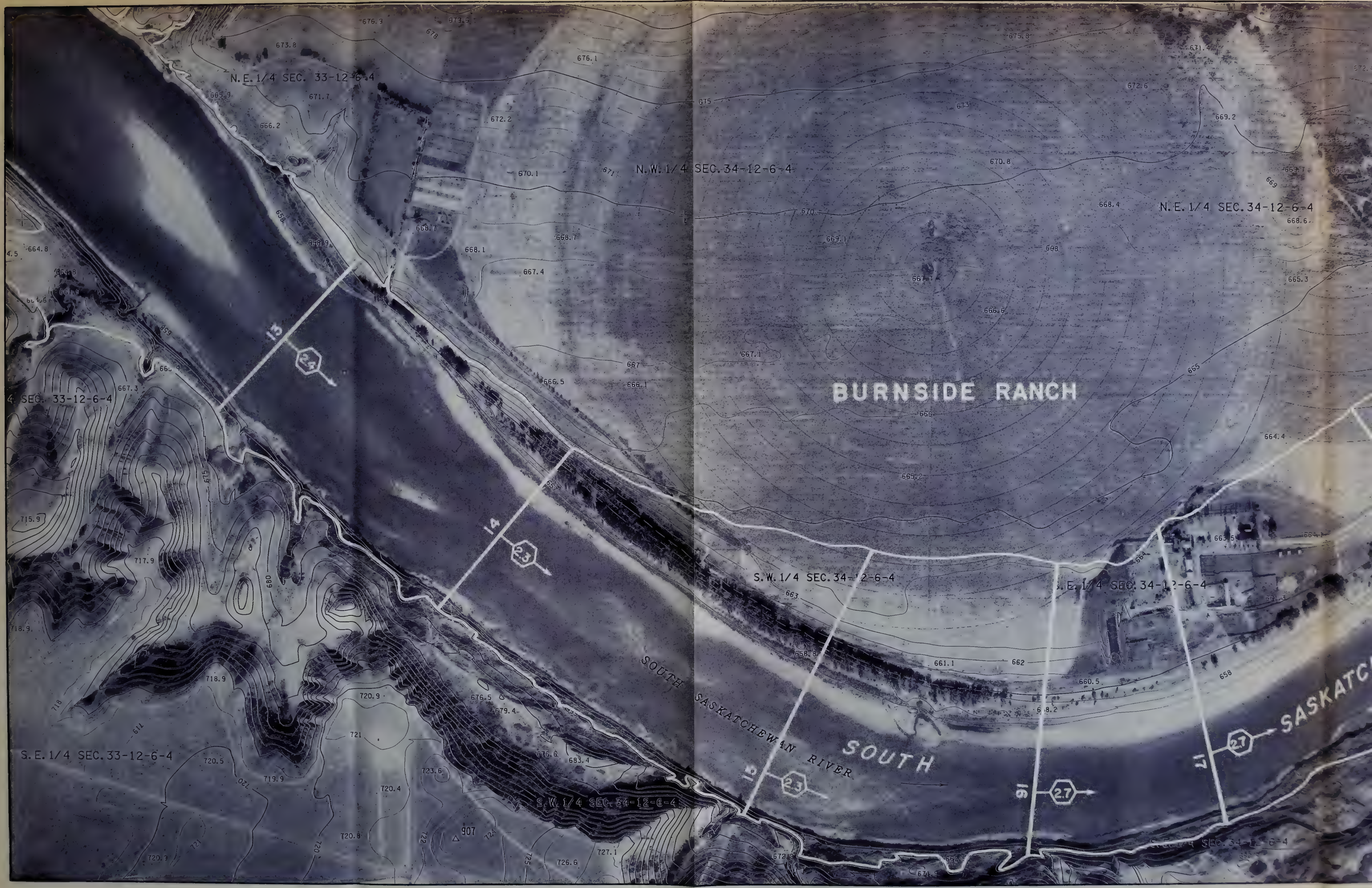
Water Resources Management Service
Technical Services Division

DRAWN BY: E. Bernhauser	APPROVED BY: M. [illegible]	FIGURE 5
CHECKED BY: T. Warhold	DATE: May 1/86	SHEET 4 OF 14


BURNSIDE RANCH
N.E. 1/4 SEC. 33-12-6-4
N.W. 1/4 SEC. 34-12-6-4
N.E. 1/4 SEC. 34-12-6-4
S.W. 1/4 SEC. 34-12-6-4
E. 1/4 SEC. 34-12-6-4
SEC. 33-12-6-4
S.E. 1/4 SEC. 33-12-6-4
S.W. 1/4 SEC. 34-12-6-4
SOUTH SASKATCHEWAN RIVER
SOUTH
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676.3
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672.6
671.7
666.2
672.2
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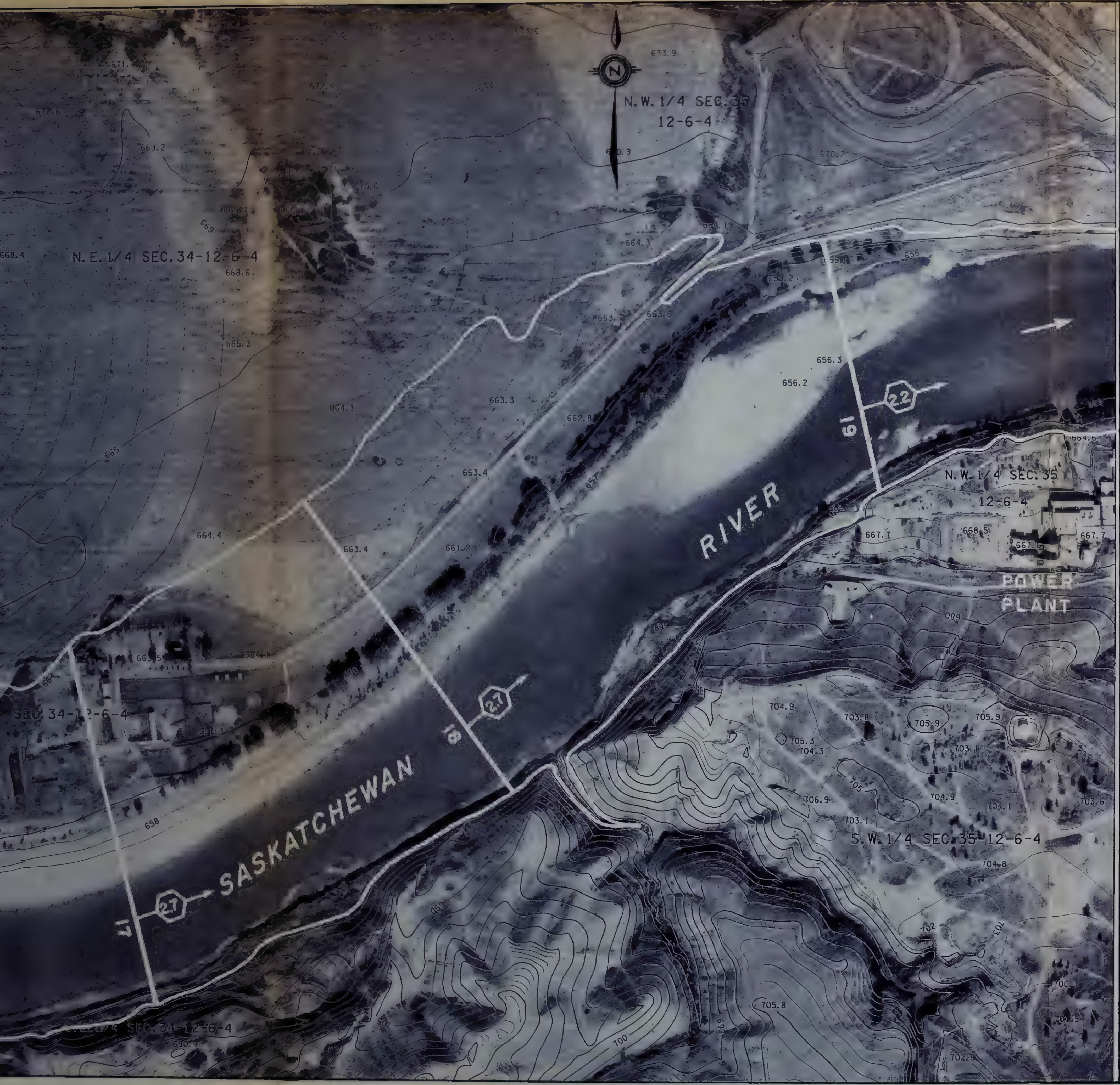
669.2
670.1
670.8
668.4
668.6
668.7
669.1
668.1
667.4
665.3
666.6
667.1
666.5
666.1
666
664.4
665.2
663.5
663
658.8
661.1
662
660.5
658
715.9
717.9
718.9
720.9
676.5
679.4
721
676.6
683.4
720.5
719.9
723.6
720.4
720.8
907
727.1
726.6
720.3


N
N.W. 1/4 SEC. 35
12-6-4
N.E. 1/4 SEC. 34-12-6-4
SEC. 34-12-6-4
SEC. 34-12-6-4
N.W. 1/4 SEC. 35
12-6-4
S.W. 1/4 SEC. 35 12-6-4
SOUTH SASKATCHEWAN RIVER
POWER PLANT
17
18
19
2.7
2.7
2.2

Water Resources

LEGEND

1:100 YEAR FLOOD RISK LIMITS

16 CROSS-SECTION LOCATION AND NUMBER

3.7 MEAN CHANNEL VELOCITY (m/s) FOR A 1:100 YEAR FLOOD

0 100 200 300 400 500 m

SCALE 1:5000

* BASE MAPPING PRODUCED BY THE ALBERTA BUREAU OF SURVEYING AND MAPPING, 1984.

ORTHOPHOTO SEPTEMBER, 1983
CONTOUR INTERVAL 1.0 metre

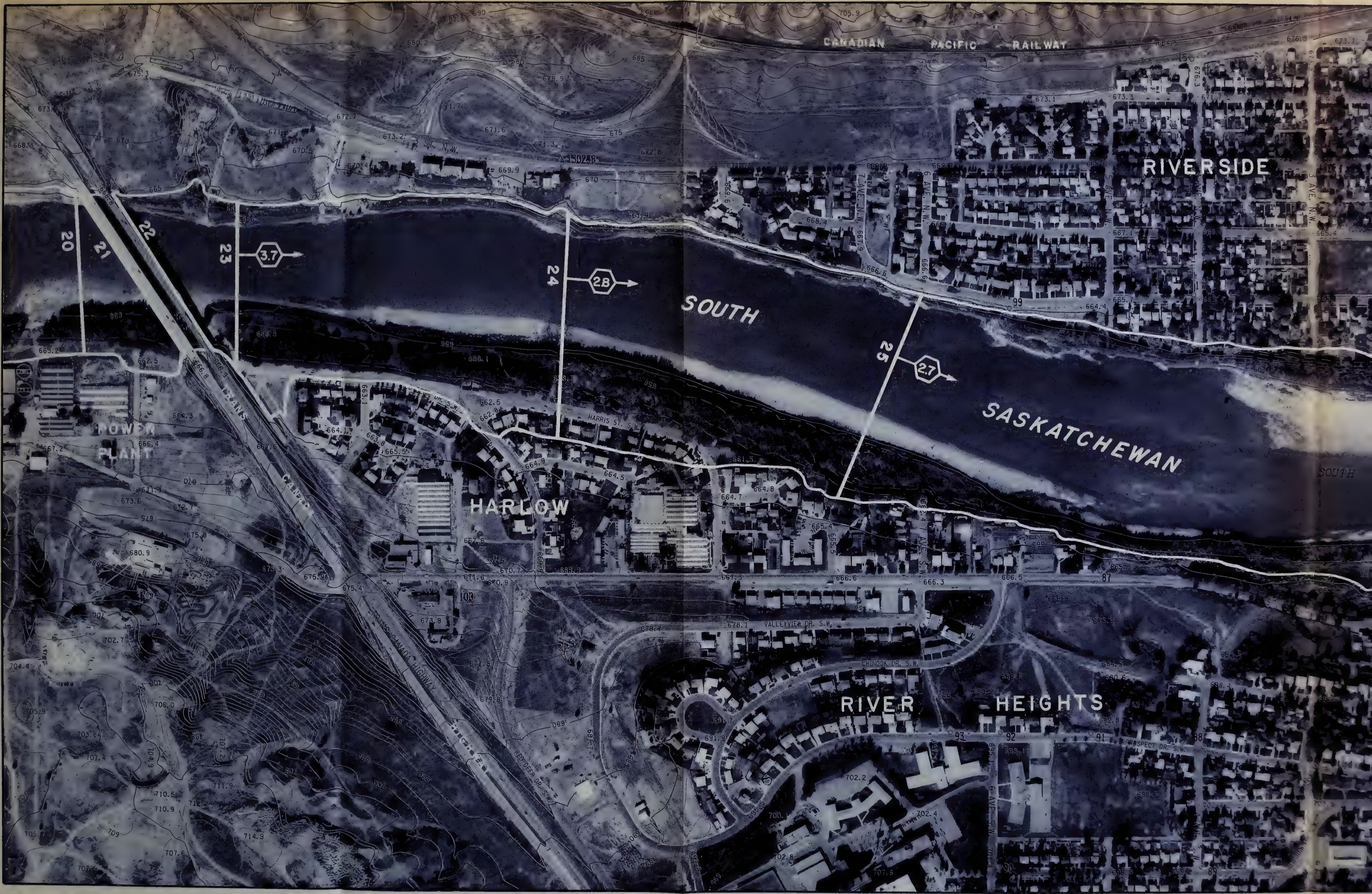
Alberta
ENVIRONMENT

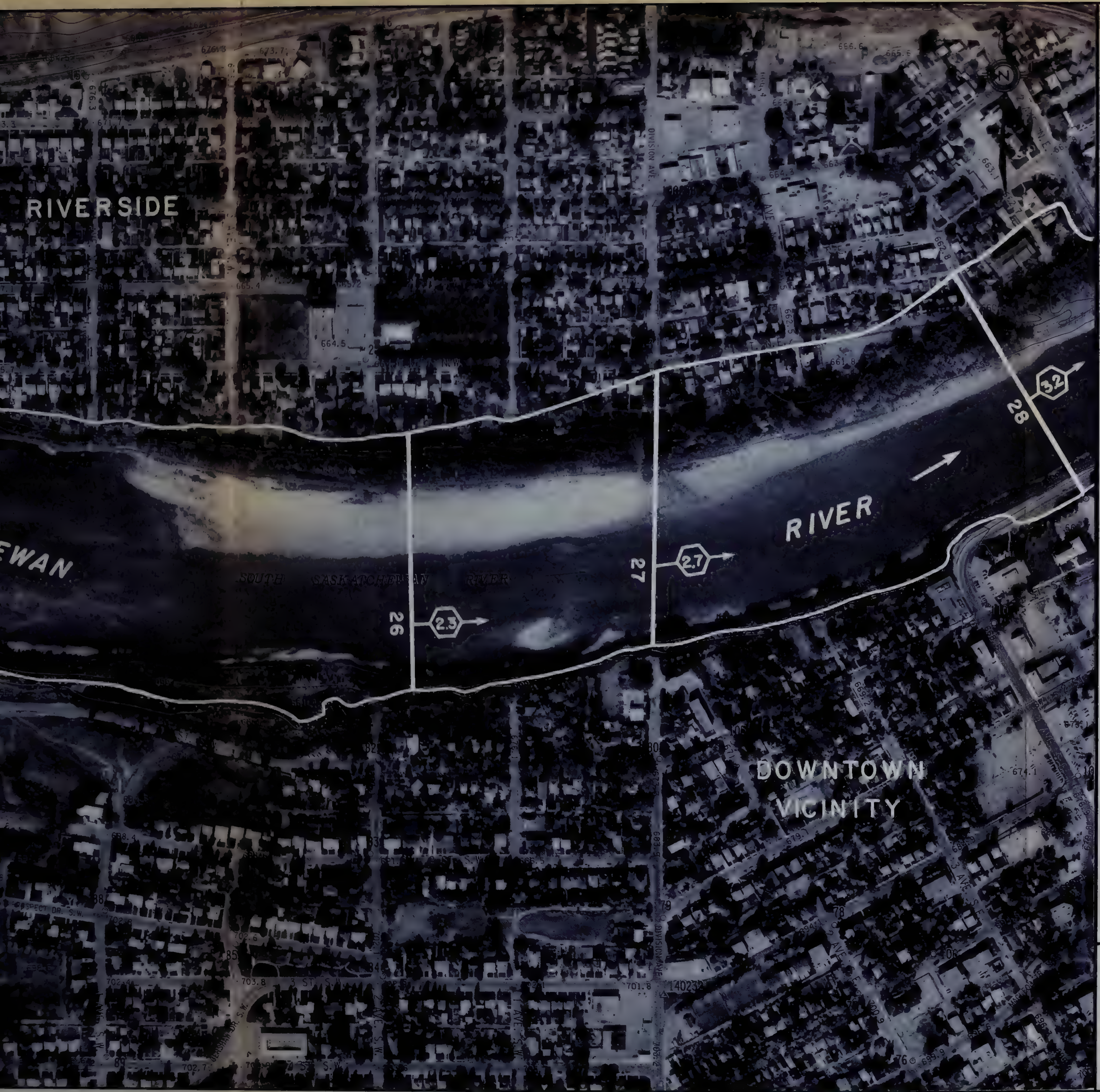
Water Resources Management Service
Technical Services Division

MEDICINE HAT FLOODPLAIN STUDY

FLOOD RISK MAP –
SOUTH SASKATCHEWAN RIVER

DRAWN BY: E. Bernhauser
CHECKED BY: T. Winhold
APPROVED BY: M. Chong
DATE: May 1/86
FIGURE 5
SHEET 5 OF 14


CANADIAN PACIFIC RAILWAY
RIVERSIDE
SOUTH
SASKATCHEWAN
SOUTH
HARLOW
POWER PLANT
RIVER HEIGHTS
TRANS CANADA HIGHWAY
HARRIS ST. S.W.
VALLEYVIEW DR. S.W.
CHINOOK DR. S.W.
PROSPECT DR. S.E.
RED DEER DR. S.W.
7 AVE. N.W.
6 AVE. N.W.
3 AVE. N.W.
6 AVE. S.W.
7 AVE. S.W.
20
21
22
23
3.7
24
2.8
25
2.7


RIVERSIDE
DIVISION AVE.
EWAN
SOUTH SASKATCHEWAN RIVER
RIVER
26
2.3
27
2.7
28
3.2
DOWNTOWN VICINITY
664.5

Water Resources

LEGEND

	1:100 YEAR FLOOD RISK LIMITS
16	CROSS-SECTION LOCATION AND NUMBER
3.7	MEAN CHANNEL VELOCITY (m/s) FOR A 1:100 YEAR FLOOD

0 100 200 300 400 500 m

SCALE 1:5000

* BASE MAPPING PRODUCED BY THE ALBERTA BUREAU OF SURVEYING AND MAPPING, 1984.

ORTHOPHOTO SEPTEMBER, 1983
CONTOUR INTERVAL 1.0 metre

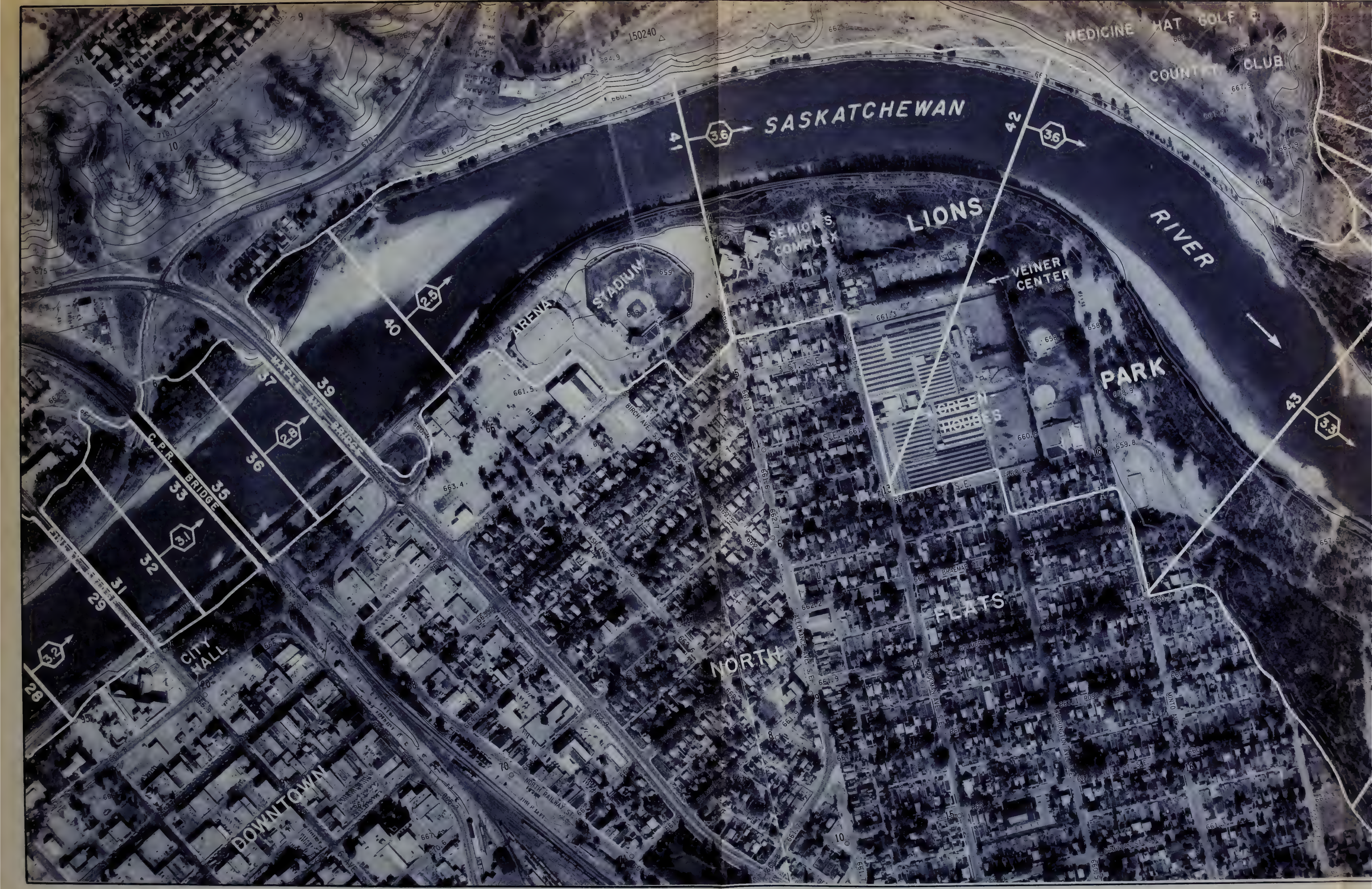
Alberta
ENVIRONMENT

Water Resources Management Service
Technical Services Division

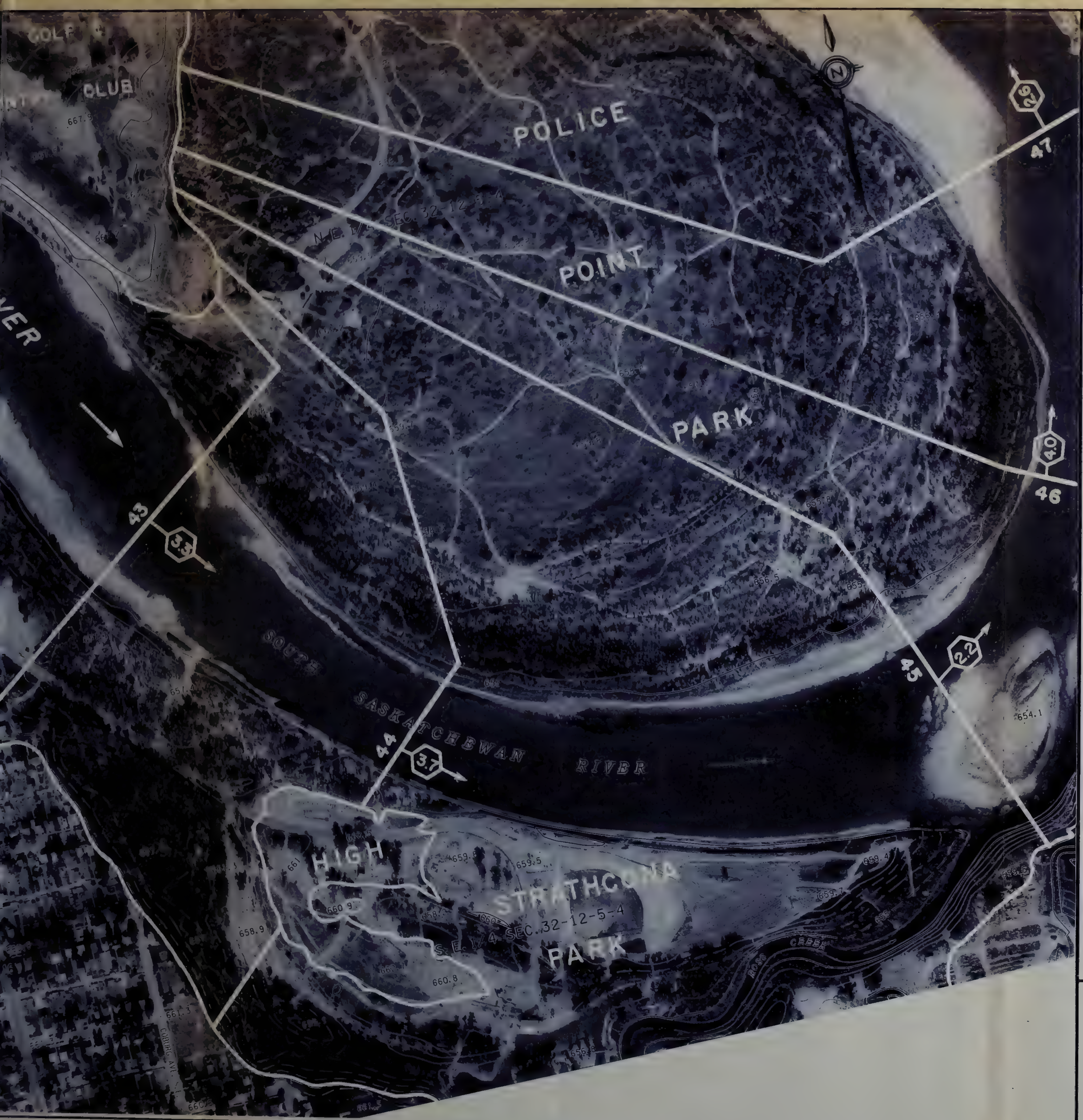
MEDICINE HAT FLOODPLAIN STUDY

FLOOD RISK MAP – SOUTH SASKATCHEWAN RIVER

DRAWN BY: E. Bernhauser	APPROVED BY: M. Ouazi	FIGURE 5
CHECKED BY: T. Winhold	DATE: May 1/86	SHEET 6 OF 14



MEDICINE HAT GOLF & COUNTRY CLUB
SASKATCHEWAN RIVER
LIONS PARK
SENIOR'S COMPLEX
VEINER CENTER
STADIUM
ARENA
GREEN HOUSES
NORTH FLATS
DOWNTOWN
CITY HALL
C.P.R. BRIDGE
MAPLE AVE. BRIDGE
2 ST. S.E.
3 ST. S.E.
4 ST. S.E.
5 ST. S.E.
BIRCH AVE. S.E.
BRAEMAR ST. S.E.
WOODMAN AVE. S.E.
WASHINGTON AVE. S.E.
MINTO AVE.
NORTH RAILWAY ST.
150240
28
29
31
32
33
35
36
37
39
40
41
42
43
3.2
3.1
2.8
2.5
3.6
3.6
3.3


GOLF
CLUB
667.5
POLICE
POINT
PARK
N.E. 1/4 SEC.32-12-5-4
VER
43
3.3
44
3.7
45
2.2
46
4.0
47
2.6
SOUTH SASKATCHEWAN RIVER
656.5
654.1
HIGH
STRATHCONA
PARK
S.E. 1/4 SEC.32-12-5-4
659.8
659.5
660.9
660.8
658.9
661
ROSS CREEK

Water Resources

LEGEND

1:100 YEAR FLOOD RISK LIMITS

CROSS-SECTION LOCATION AND NUMBER

MEAN CHANNEL VELOCITY (m/s)
FOR A 1:100 YEAR FLOOD

0 100 200 300 400 500 m

SCALE 1:5000

* BASE MAPPING PRODUCED BY THE ALBERTA BUREAU OF SURVEYING AND MAPPING, 1984.

ORTHOPHOTO	SEPTEMBER, 1983
CONTOUR INTERVAL	1.0 metre

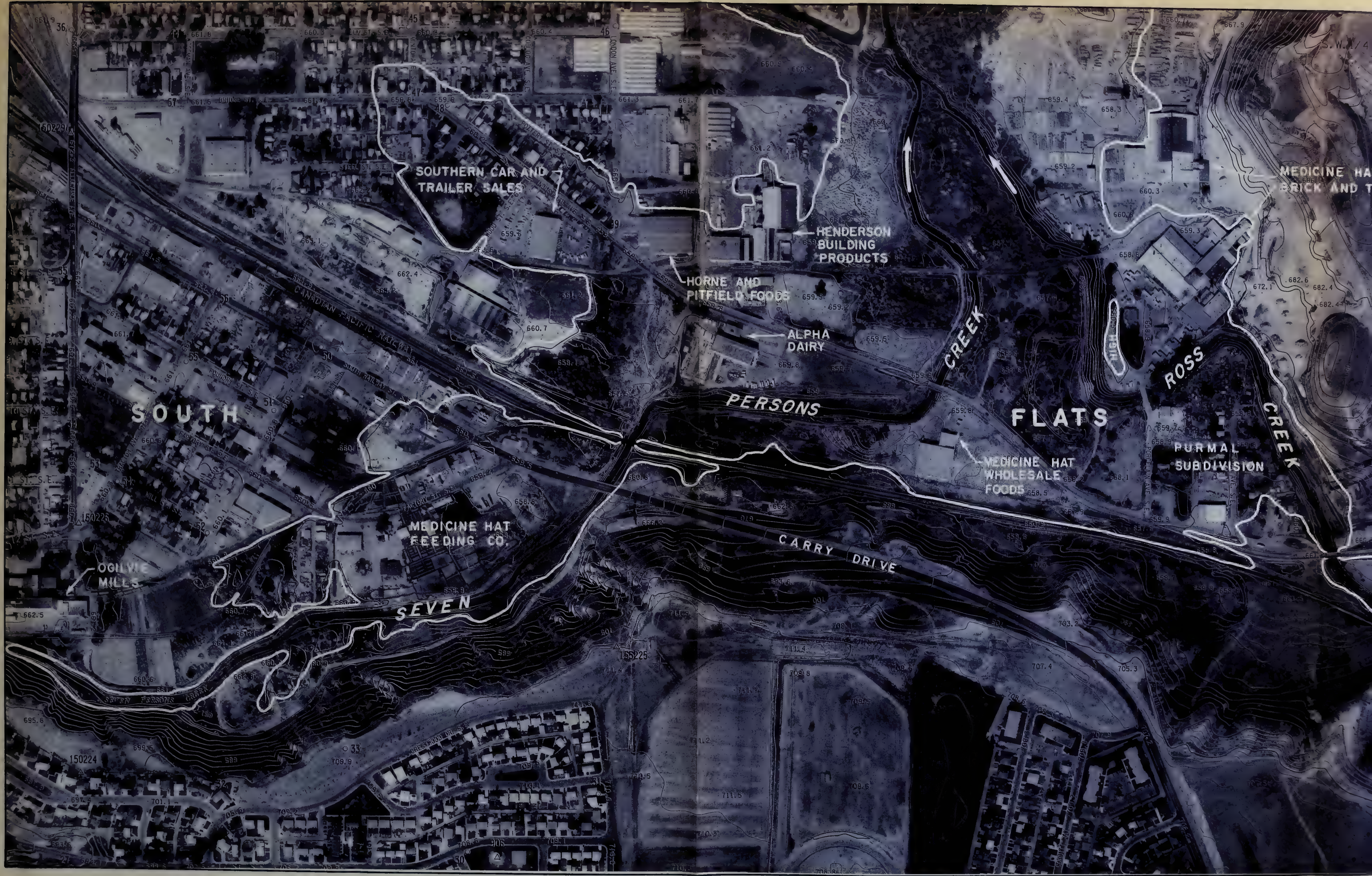
Alberta
ENVIRONMENT

Water Resources Management Service
Technical Services Division

MEDICINE HAT FLOODPLAIN STUDY

FLOOD RISK MAP – SOUTH SASKATCHEWAN RIVER

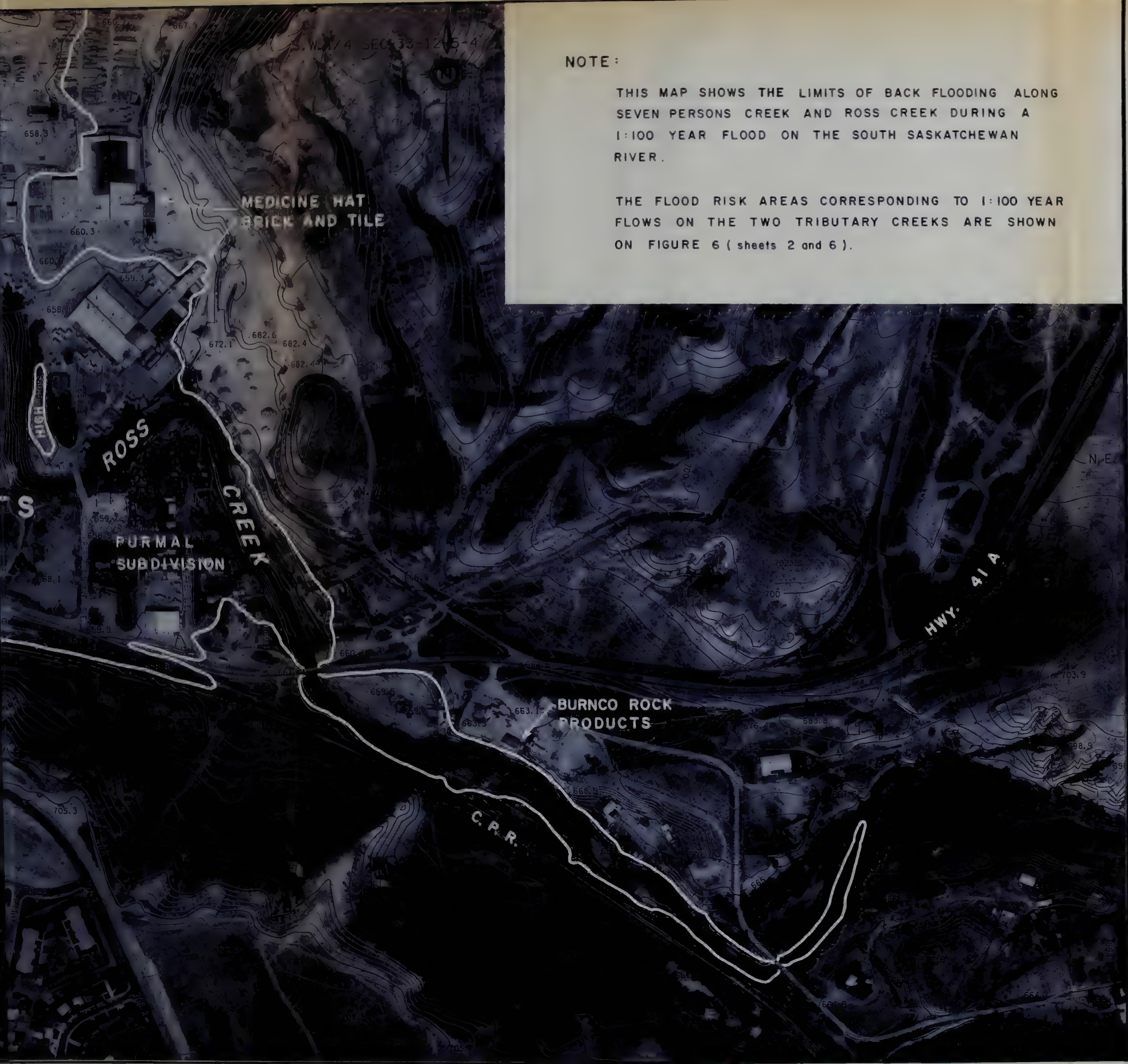
DRAWN BY: E. Sumlauser	APPROVED BY: M. Chang	FIGURE 5
CHECKED BY: T. Weihold	DATE: May 1/86	SHEET 7 OF 14


SOUTHERN CAR AND TRAILER SALES
HENDERSON BUILDING PRODUCTS
HORNE AND PITFIELD FOODS
ALPHA DAIRY
CANADIAN PACIFIC RAILWAY
MEDICINE HA
BRICK AND T
S.W.1/4
SOUTH
PERSONS
FLATS
CREEK
ROSS
CREEK
MEDICINE HAT WHOLESALE FOODS
PURMAL SUBDIVISION
MEDICINE HAT FEEDING CO.
OGILVIE MILLS
SEVEN
CARRY DRIVE
SEVEN PERSONS CREEK
150229
150226
150224
155225

NOTE:

THIS MAP SHOWS THE LIMITS OF BACK FLOODING ALONG SEVEN PERSONS CREEK AND ROSS CREEK DURING A 1:100 YEAR FLOOD ON THE SOUTH SASKATCHEWAN RIVER.

THE FLOOD RISK AREAS CORRESPONDING TO 1:100 YEAR FLOWS ON THE TWO TRIBUTARY CREEKS ARE SHOWN ON FIGURE 6 (sheets 2 and 6).


S.W.1/4 SEC.33-12-5-4
N
MEDICINE HAT BRICK AND TILE
HIGH
ROSS CREEK
S
PURMAL SUBDIVISION
BURNCO ROCK PRODUCTS
C.P.R.
HWY. 41 A
N.E.
658.3
660.3
660.
659.3
658
672.1
682.6
682.4
682.4
659.
658.1
659.9
660.
659.6
663.1
663.5
683.8
668.
702
700
703.9
705.3
665

Water Resources

LEGEND

═	1:100 YEAR FLOOD RISK LIMITS
16	CROSS-SECTION LOCATION AND NUMBER
3.7	MEAN CHANNEL VELOCITY (m/s) FOR A 1:100 YEAR FLOOD

0 100 200 300 400 500 m

SCALE 1:5000

* BASE MAPPING PRODUCED BY THE ALBERTA BUREAU OF SURVEYING AND MAPPING, 1984.

ORTHOPHOTO	SEPTEMBER, 1983
CONTOUR INTERVAL	1.0 metre

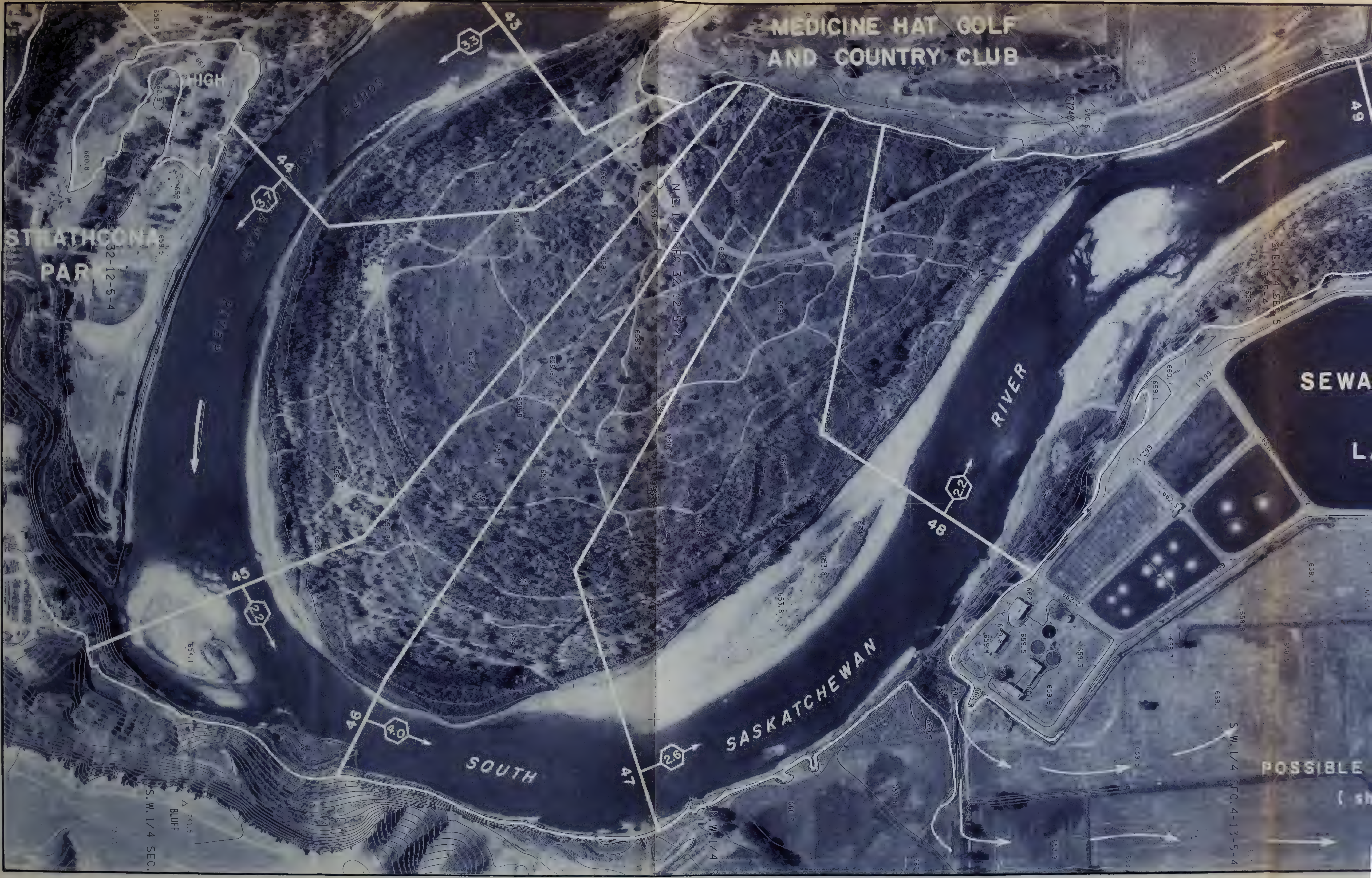
MEDICINE HAT FLOODPLAIN STUDY

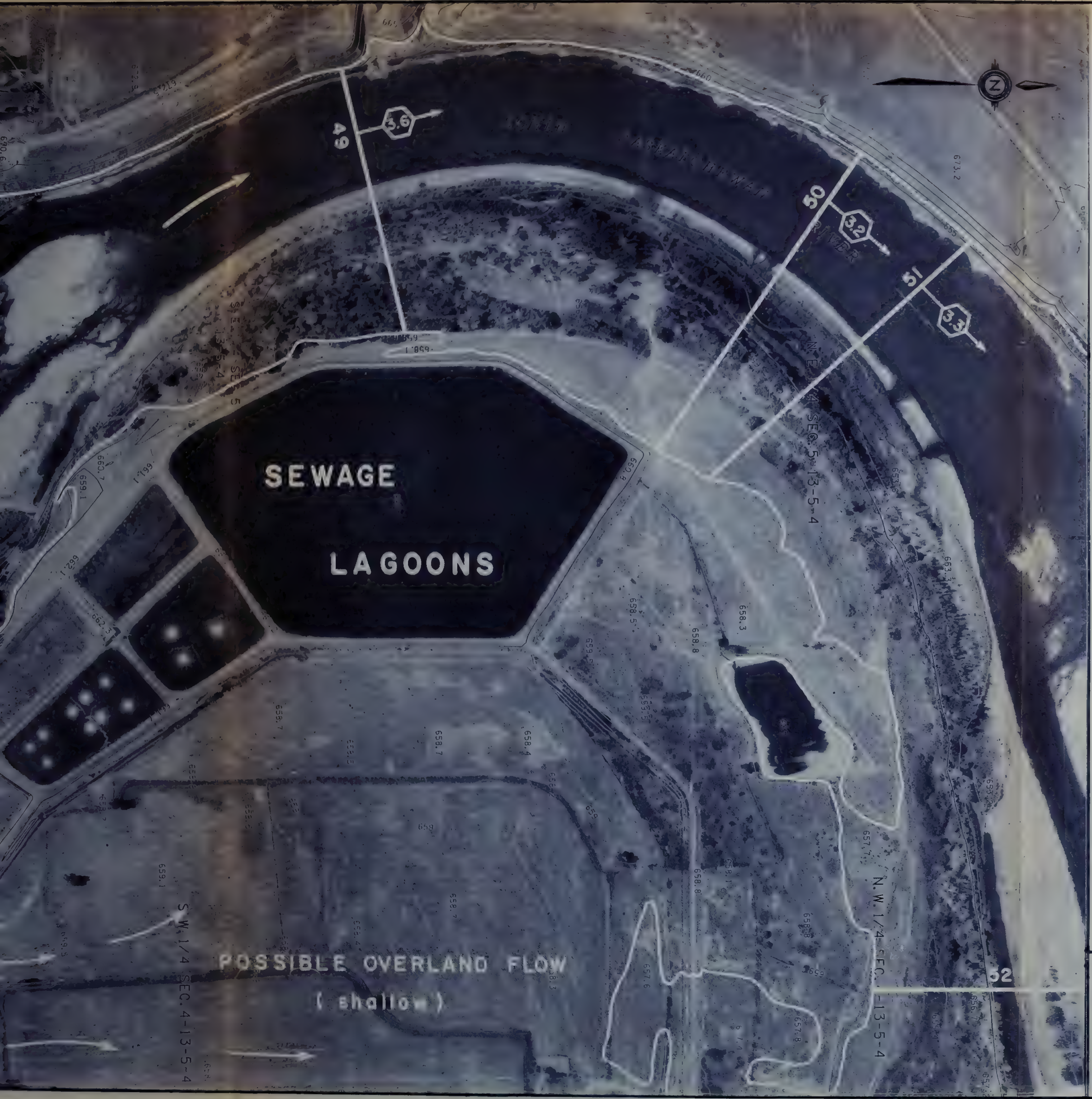
FLOOD RISK MAP – SOUTH SASKATCHEWAN RIVER

Alberta
ENVIRONMENT

Water Resources Management Service
Technical Services Division

DRAWN BY: E. Bernhauser	APPROVED BY: M. Chazi	FIGURE 5
CHECKED BY: T. Winhold	DATE: May 1/86	SHEET 8 OF 14


MEDICINE HAT GOLF
AND COUNTRY CLUB
STRATHCONA
PARK
HIGH
SOUTH
SASKATCHEWAN
RIVER
RIVER
SEWA
L
POSSIBLE
(sh
N.E. 1/4 SEC. 32-12-5-4
S.E. 1/4 SEC. 5
13-5-4
S.W. 1/4 SEC. 4-13-5-4
S.W. 1/4 SEC.
N.W. 1/4 S
32-12-5-4
BLUFF
741.5
43
44
45
46
47
48
49
3.3
3.7
2.2
4.0
2.6
2.2
654.1
653.8
662.2
662.3
660.7
659.1
658.7
659.5
659.9
659.3


49
3.6
50
3.2
51
3.3
52
SOUTH SASKATCHEWAN RIVER
SEWAGE
LAGOONS
N.E. 1/4 SEC. 5-13-5-4
N.W. 1/4 SEC. 5-13-5-4
S.W. 1/4 SEC. 4-13-5-4
POSSIBLE OVERLAND FLOW
(shallow)
673.2
659
658.8
658.7
658.4
658.3
657.8

Water Resources

LEGEND

- 1:100 YEAR FLOOD RISK LIMITS
- CROSS-SECTION LOCATION AND NUMBER
- MEAN CHANNEL VELOCITY (m / s) FOR A 1:100 YEAR FLOOD

0 100 200 300 400 500 m

SCALE 1:5000

* BASE MAPPING PRODUCED BY THE ALBERTA BUREAU OF SURVEYING AND MAPPING, 1984.

ORTHOPHOTO	SEPTEMBER, 1983
CONTOUR INTERVAL	1.0 metre

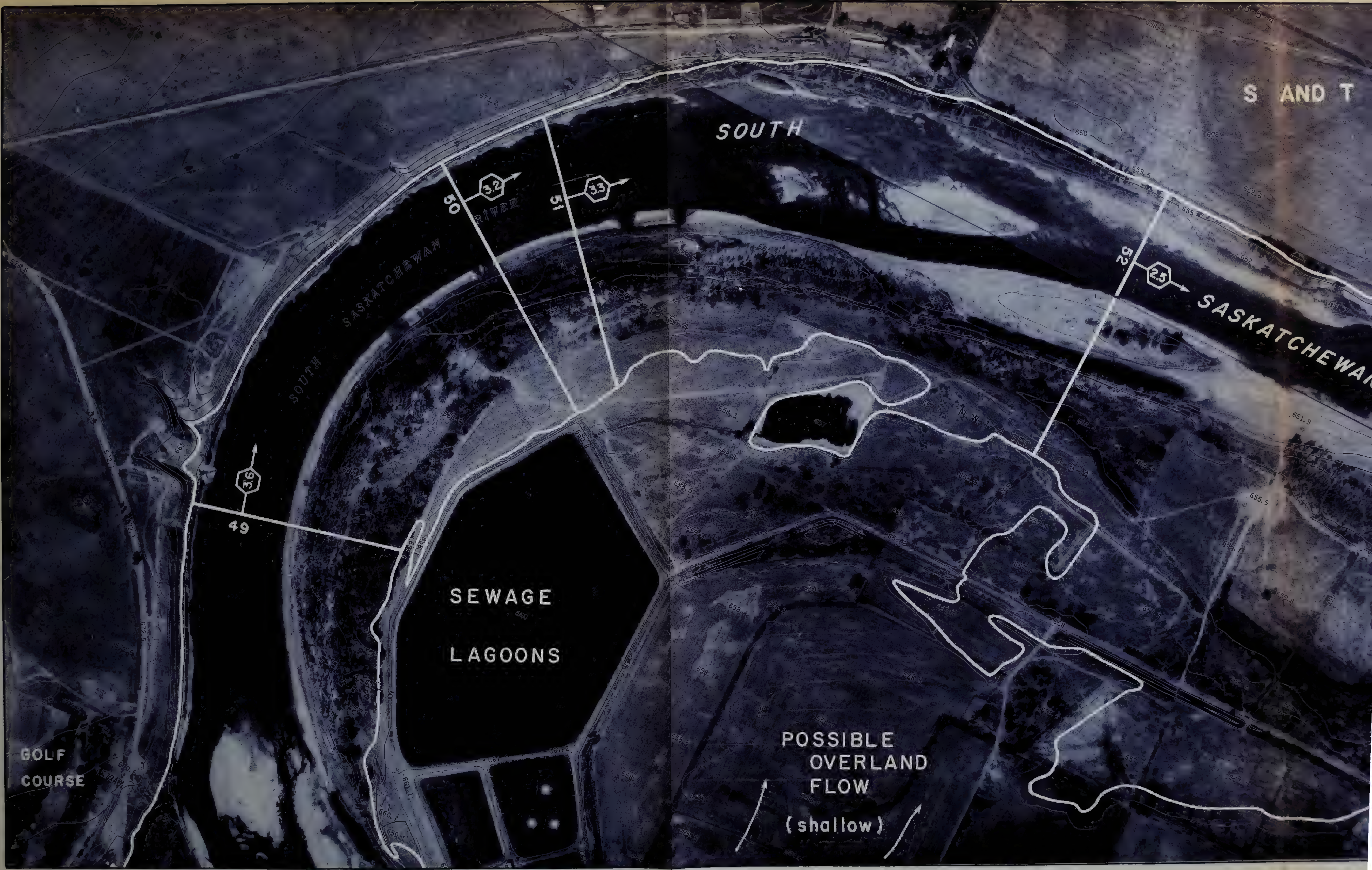
Alberta
ENVIRONMENT

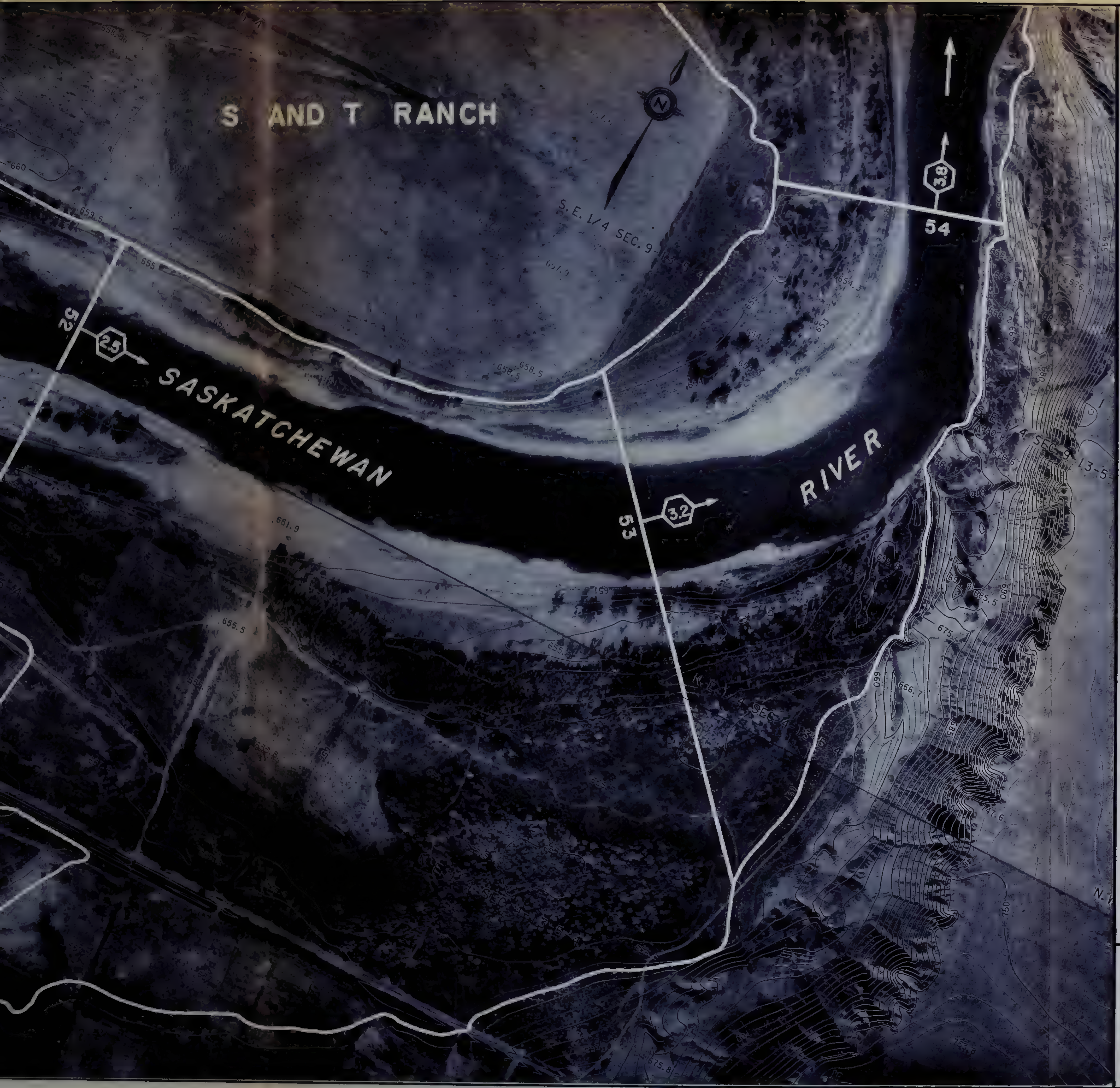
Water Resources Management Service
Technical Services Division

MEDICINE HAT FLOODPLAIN STUDY

FLOOD RISK MAP — SOUTH SASKATCHEWAN RIVER

DRAWN BY: E. Bernhauser	APPROVED BY: M. Anaz	FIGURE 5
CHECKED BY: T. Winhold	DATE: May 1/86	SHEET 9 OF 14


S AND T
SOUTH
SASKATCHEWA
SOUTH SASKATCHEWAN RIVER
49
3.6
50
3.2
51
3.3
52
2.5
SEWAGE LAGOONS
GOLF COURSE
POSSIBLE OVERLAND FLOW
(shallow)
672.2
660
659.5
655
652
651.9
655.5
658.3
660.8
661.2
660.1


S AND T RANCH
N
S.E. 1/4 SEC. 9
54
3.8
52
2.5
SASKATCHEWAN
RIVER
53
3.2
660
659.5
655
661.9
655.5
654.3
653
658.5
675
685.5
690
666.7
13-5
747.6
750
675.8
N.W.

Water Resources

LEGEND

═ 1:100 YEAR FLOOD RISK LIMITS

16 CROSS-SECTION LOCATION AND NUMBER

3.7 MEAN CHANNEL VELOCITY (m/s) FOR A 1:100 YEAR FLOOD

0 100 200 300 400 500 m

SCALE 1:5000

* BASE MAPPING PRODUCED BY THE ALBERTA BUREAU OF SURVEYING AND MAPPING, 1984.

ORTHOPHOTO	SEPTEMBER, 1983
CONTOUR INTERVAL	1.0 metre

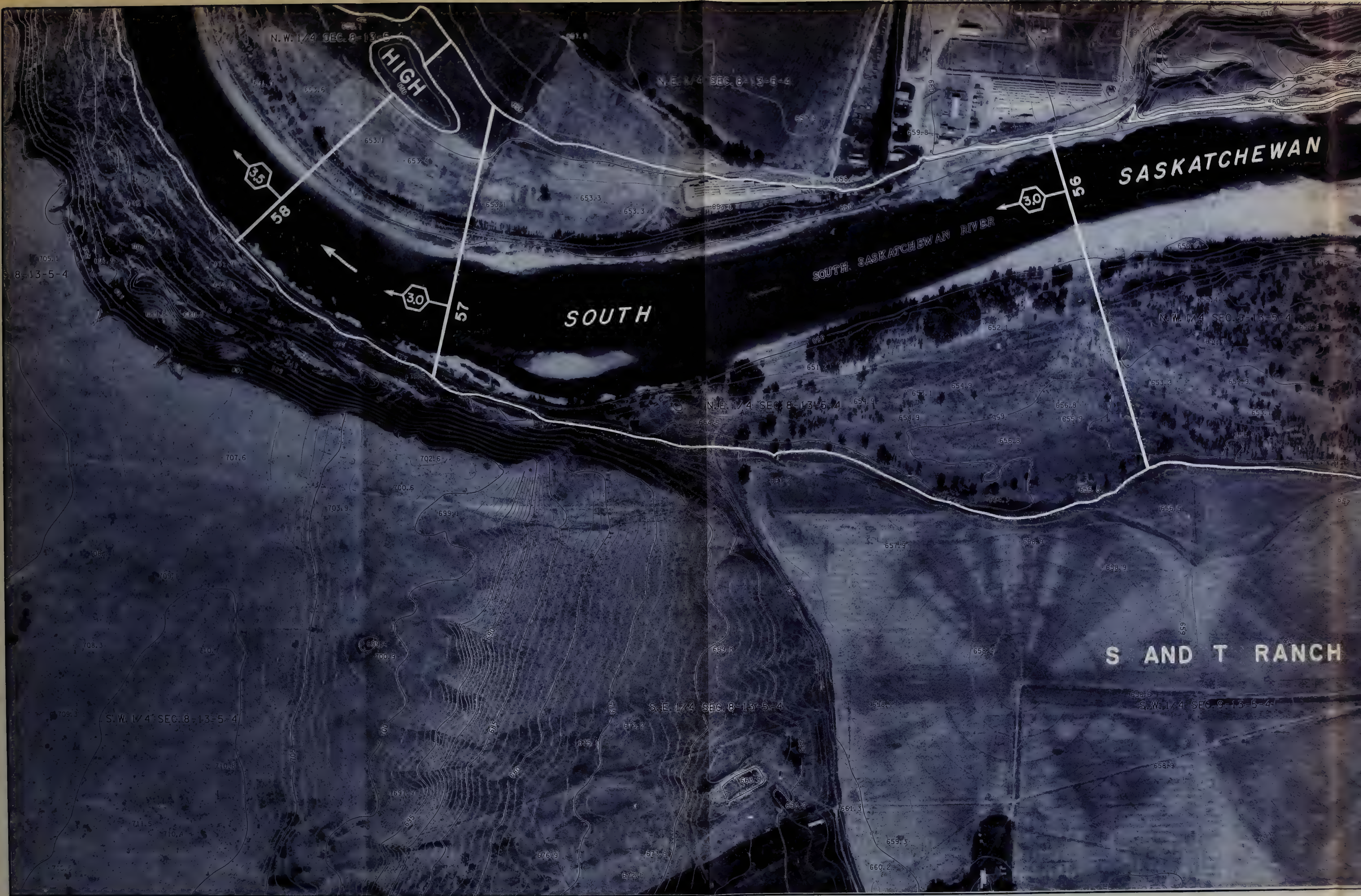
Alberta
ENVIRONMENT

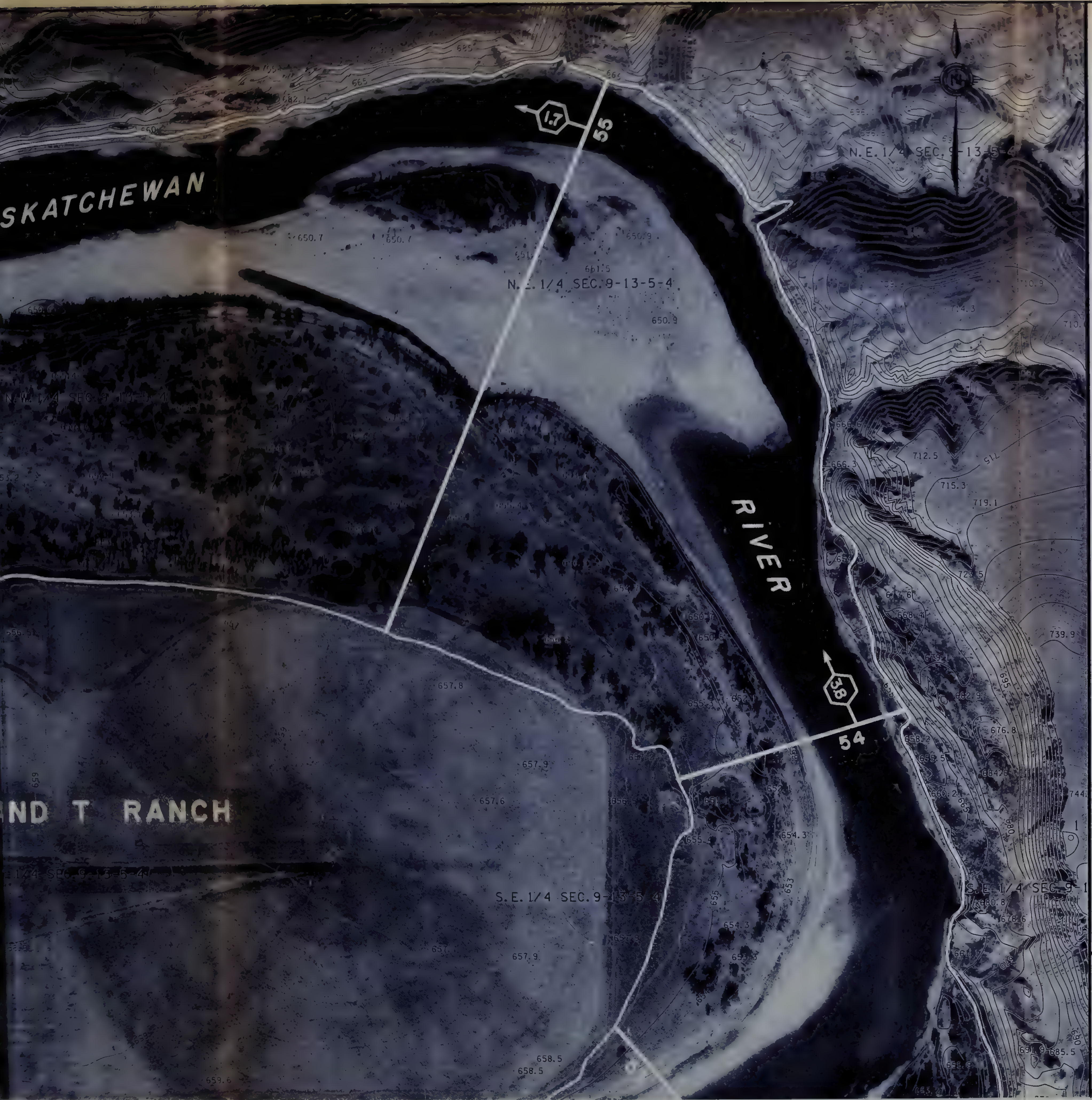
Water Resources Management Service
Technical Services Division

MEDICINE HAT FLOODPLAIN STUDY

FLOOD RISK MAP — SOUTH SASKATCHEWAN RIVER

DRAWN BY: E Bernhauser
APPROVED BY: M. Chang
CHECKED BY: T. Winhold
DATE: May 1/86
FIGURE 5
SHEET 10 OF 14


N.W. 1/4 SEC. 8-13-6-4
HIGH
N.E. 1/4 SEC. 8-13-6-4
3.5
58
3.0
57
SOUTH
SASKATCHEWAN
3.0
56
SOUTH SASKATCHEWAN RIVER
8-13-5-4
N.W. 1/4 SEC. 9-13-5-4
N.E. 1/4 SEC. 8-13-5-4
S AND T RANCH
S.E. 1/4 SEC. 8-13-5-4
S.W. 1/4 SEC. 8-13-5-4
S.W. 1/4 SEC. 9-13-5-4


SKATCHEWAN
RIVER
1.7
55
3.8
54
N.E. 1/4 SEC. 9-13-5-4
N.E. 1/4 SEC. 9-13-5-4
N.W. 1/4 SEC. 9-13-5-4
ND T RANCH
1/4 SEC. 9-13-5-4
S.E. 1/4 SEC. 9-13-5-4
S.E. 1/4 SEC. 9
650.7
661.5
650.9
712.5
715.3
719.1
739.9
676.8
657.8
657.9
657.6
654.3
657.9
658.5
658.5
685.5

Water Resources

LEGEND

1:100 YEAR FLOOD RISK LIMITS

16 CROSS-SECTION LOCATION AND NUMBER

4.7 MEAN CHANNEL VELOCITY (m/s)
FOR A 1:100 YEAR FLOOD

0 100 200 300 400 500 m

SCALE 1:5000

* BASE MAPPING PRODUCED BY THE ALBERTA BUREAU OF SURVEYING AND MAPPING, 1984.

ORTHOPHOTO	SEPTEMBER, 1983
CONTOUR INTERVAL	1.0 metre

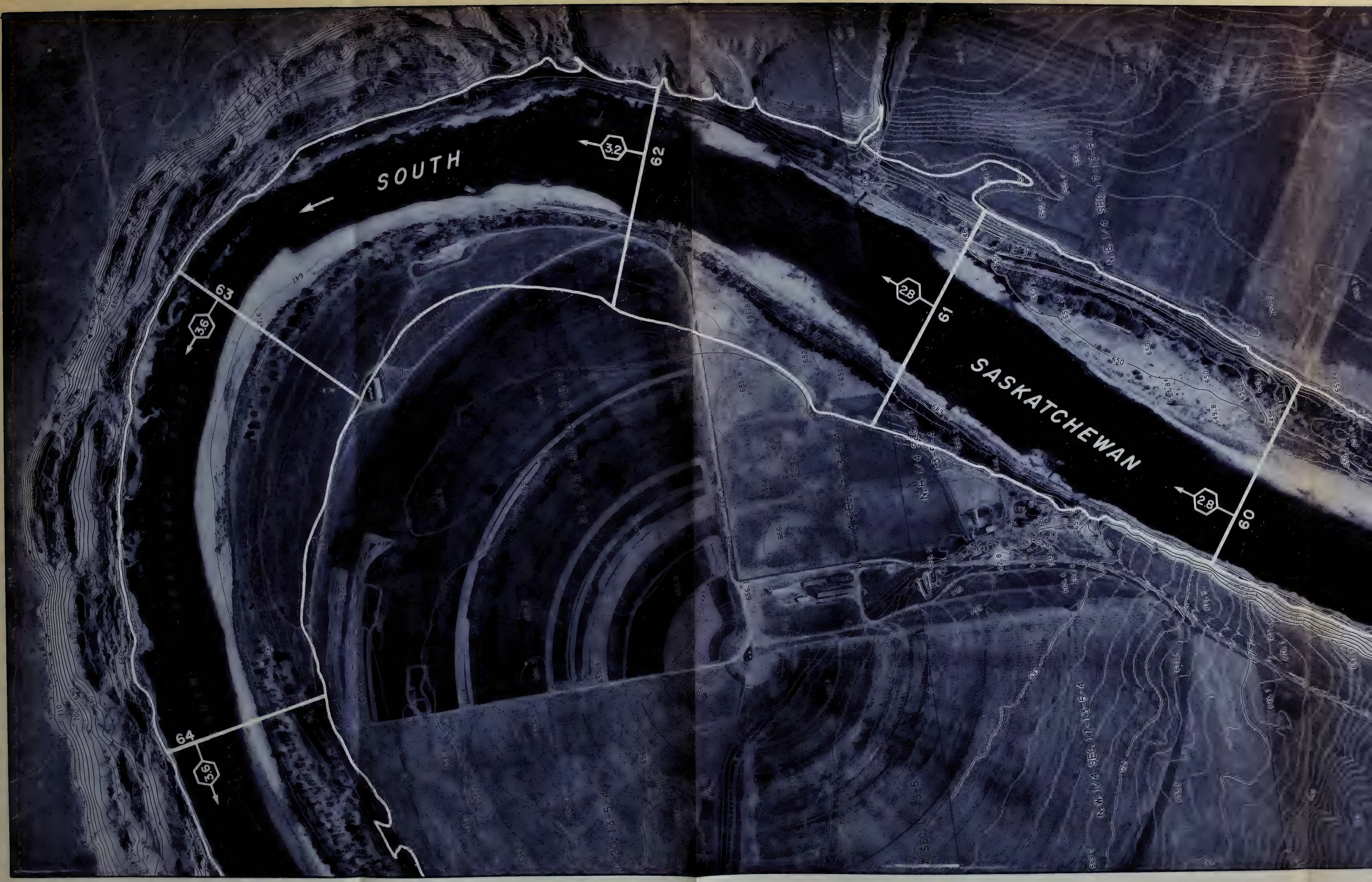
Alberta
ENVIRONMENT

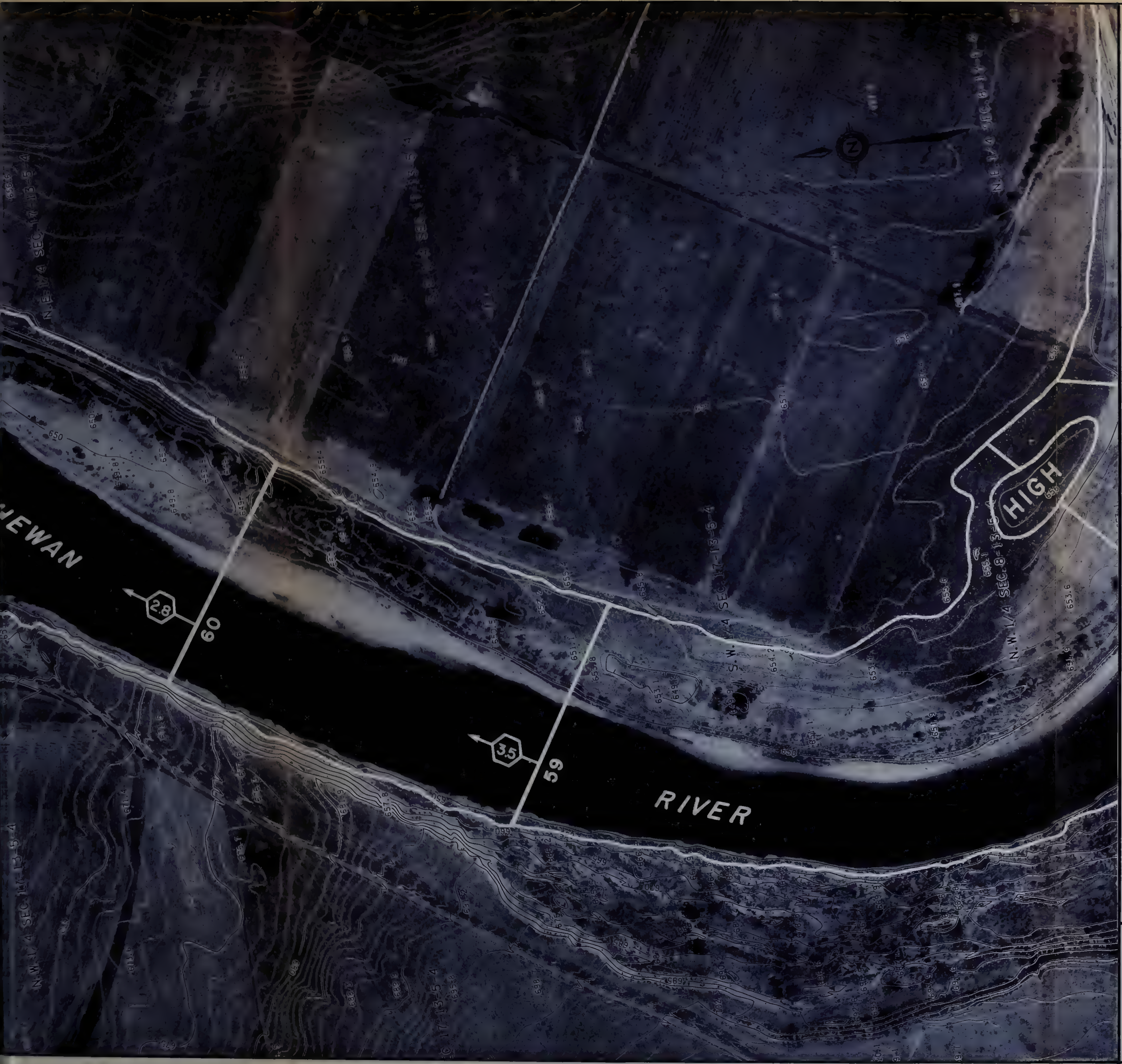
Water Resources Management Service
Technical Services Division

MEDICINE HAT FLOODPLAIN STUDY

FLOOD RISK MAP – SOUTH SASKATCHEWAN RIVER

DRAWN BY: E. Bernhauser	APPROVED BY: M. Quazi	FIGURE 5
CHECKED BY: T. Weinhold	DATE: May 1/86	SHEET 11 OF 14


SOUTH
SASKATCHEWAN
60
2.8
61
2.8
62
3.2
63
3.6
64
3.6
N.E. 1/4 SEC. 17-13-5-4
N.E. 1/4 SEC. 17-13-5-4
S.E. 1/4 SEC. 20-13-5-4
N.W. 1/4 SEC. 17-13-5-4
650
660
670
680
690
700
710



N
EWAN
RIVER
60
59
2.8
3.5
HIGH
N.E. 1/4 SEC. 18-13-5-4
S.W. 1/4 SEC. 17-13-5-4
N.W. 1/4 SEC. 8-13-5-4
N.E. 1/4 SEC. 8-13-5-4
650
653.6

Water Resources

LEGEND

1:100 YEAR FLOOD RISK LIMITS

16 CROSS - SECTION LOCATION AND NUMBER

3.7 MEAN CHANNEL VELOCITY (m / s)
FOR A 1:100 YEAR FLOOD

0 100 200 300 400 500 m

SCALE 1:5000

* BASE MAPPING PRODUCED BY THE ALBERTA BUREAU OF SURVEYING AND MAPPING, 1984.

ORTHOPHOTO	SEPTEMBER, 1983
CONTOUR INTERVAL	1.0 metre

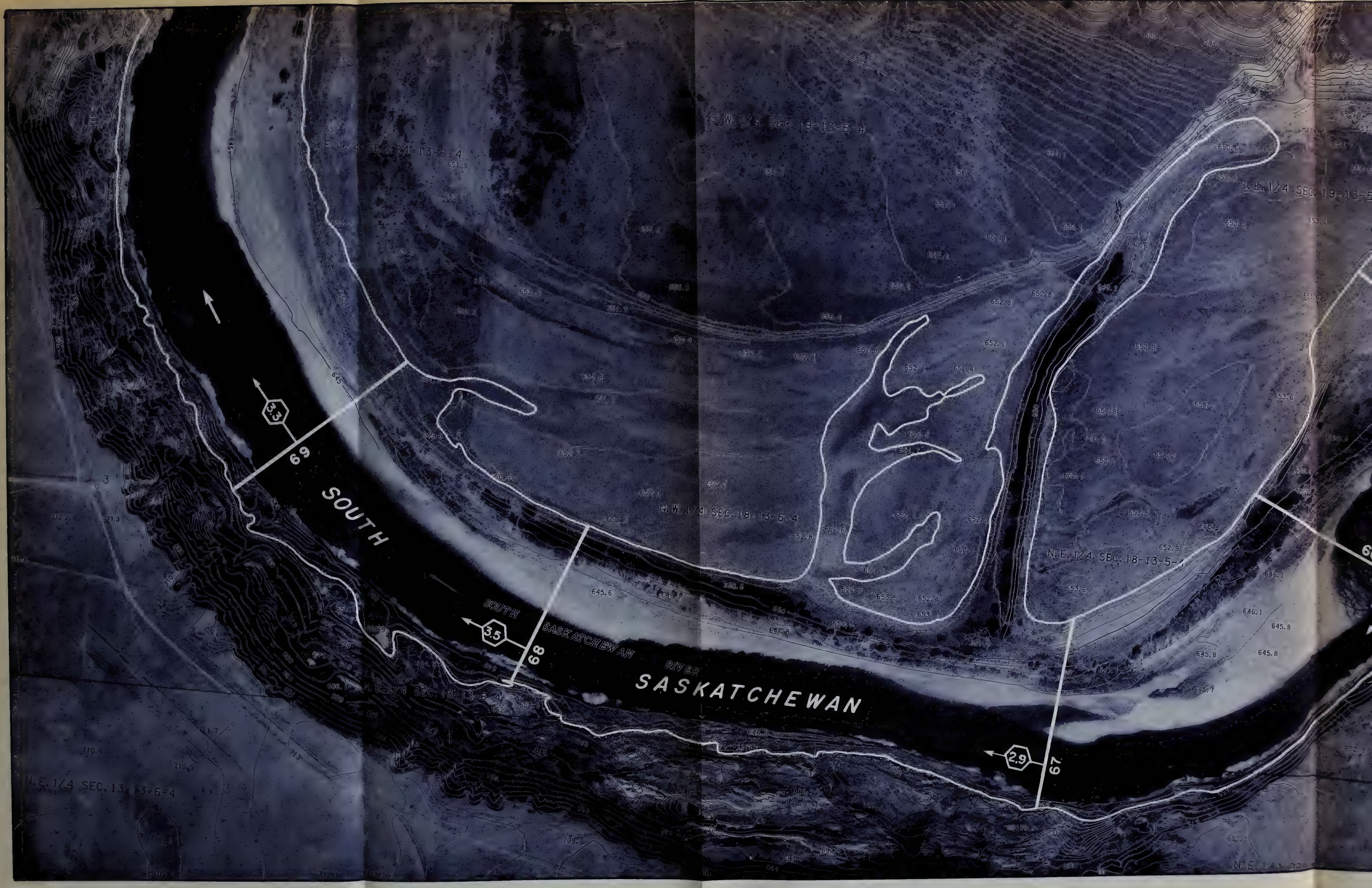
MEDICINE HAT FLOODPLAIN STUDY

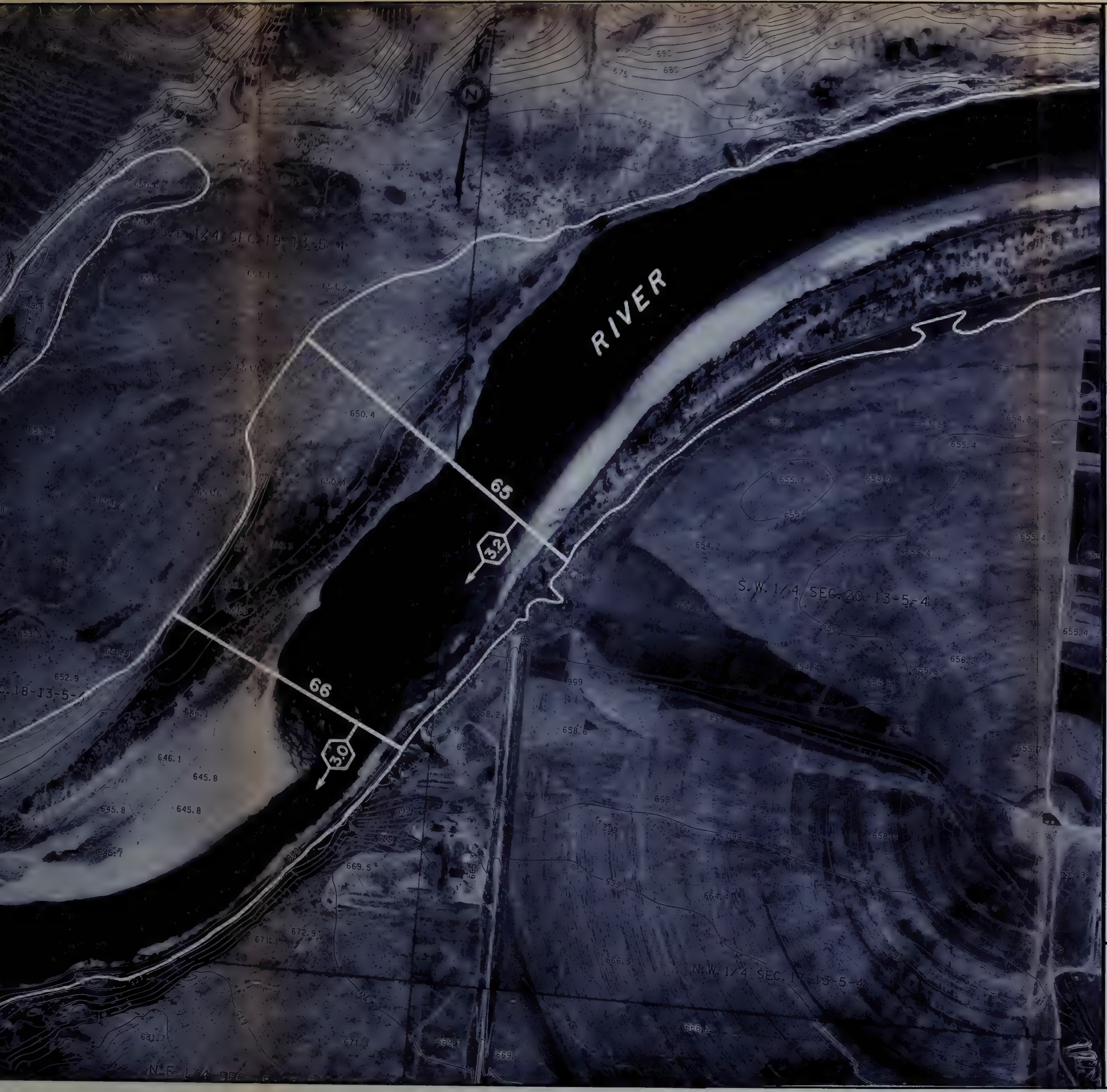
FLOOD RISK MAP – SOUTH SASKATCHEWAN RIVER

Alberta
ENVIRONMENT

Water Resources Management Service
Technical Services Division

DRAWN BY: E Bernhauser	APPROVED BY: M. Chuang	FIGURE 5
CHECKED BY: T. Winhold	DATE : May 1/86	SHEET 12 OF 14


S.E. 1/4 SEC. 24-13-6-4
S.W. 1/4 SEC. 19-13-5-4
S.E. 1/4 SEC. 19-13-5
N.W. 1/4 SEC. 18-13-5-4
N.E. 1/4 SEC. 18-13-5-4
N.E. 1/4 SEC. 13-13-6-4
N.E. 1/4 SEC. 13-13-6-4
SOUTH
SASKATCHEWAN
SOUTH SASKATCHEWAN RIVER
3.3
69
3.5
68
2.9
67
645
645.6
645.8
646.1
652.8
652.1
653.8
653.6
654.2
652.9
650.6
712.2
711.3
711.8
710.6
710.5


N
RIVER
S.E. 1/4 SEC. 19-13-5-4
S.W. 1/4 SEC. 20-13-5-4
N.W. 1/4 SEC. 17-13-5-4
N.E. 1/4 SEC.
18-13-5-
65
3.2
66
3.0
650.4
652.9
646.1
645.8
645.7
655.4
655.7
656.3
669.5
672.9
671.9

Water Resources

LEGEND

1:100 YEAR FLOOD RISK LIMITS

16 CROSS-SECTION LOCATION AND NUMBER

3.7 MEAN CHANNEL VELOCITY (m/s) FOR A 1:100 YEAR FLOOD

0 100 200 300 400 500 m

SCALE 1:5000

* BASE MAPPING PRODUCED BY THE ALBERTA BUREAU OF SURVEYING AND MAPPING, 1984.

ORTHOPHOTO	SEPTEMBER, 1983
CONTOUR INTERVAL	1.0 metre

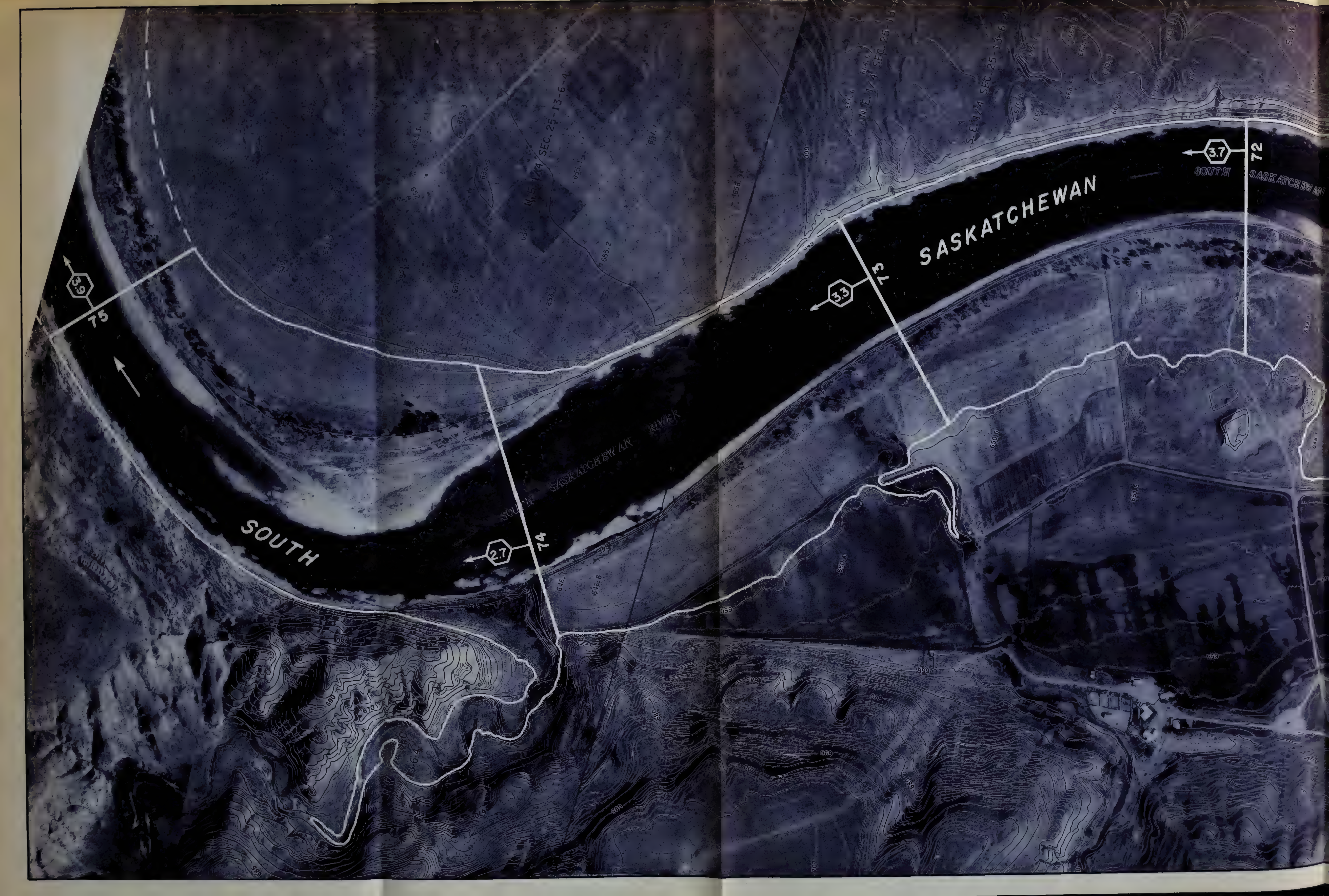
Alberta
ENVIRONMENT

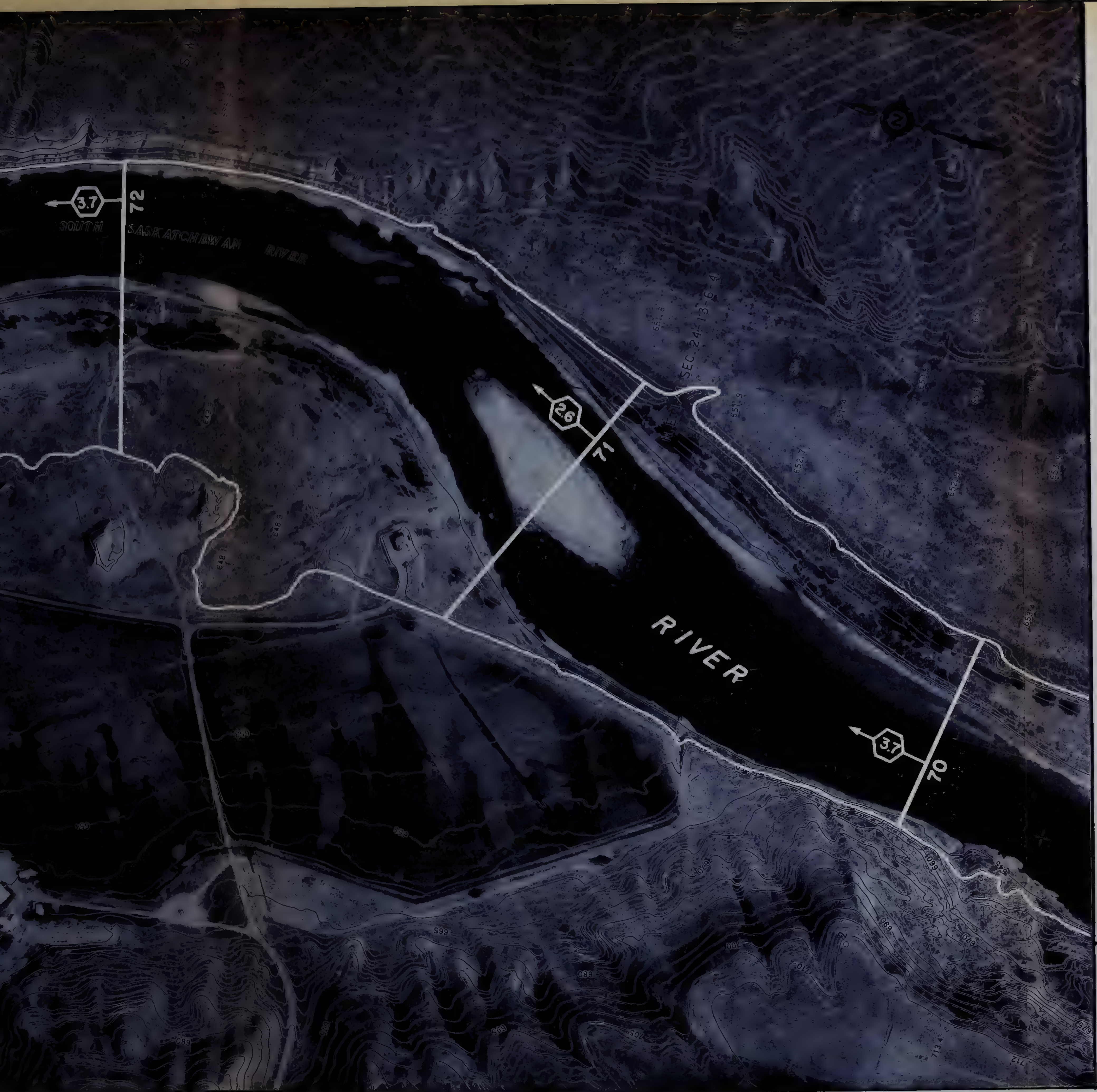
Water Resources Management Service
Technical Services Division

MEDICINE HAT FLOODPLAIN STUDY

FLOOD RISK MAP – SOUTH SASKATCHEWAN RIVER

DRAWN BY: E. Blumhauser	APPROVED BY: M. Oranzi	FIGURE 5
CHECKED BY: T. Winhold	DATE: May 1/86	SHEET 13 OF 14


SOUTH
SASKATCHEWAN
SOUTH SASKATCHEWAN RIVER
SOUTH
SASKATCHEWAN
75
3.9
74
2.7
73
3.3
72
3.7
N.E. 1/4 SEC. 25-13-6-4
N.E. 1/4 SEC. 25-13-6-4
S.E. 1/4 SEC. 25-13-6-4
S.W.
650
655.2
650.6
651.6
650.4
646.8
670
680
690



Water Resources

LEGEND

═	1:100 YEAR FLOOD RISK LIMITS
16	CROSS-SECTION LOCATION AND NUMBER
3.7	MEAN CHANNEL VELOCITY (m/s) FOR A 1:100 YEAR FLOOD

0 100 200 300 400 500 m

SCALE 1:5000

* BASE MAPPING PRODUCED BY THE ALBERTA BUREAU OF SURVEYING AND MAPPING, 1984.

ORTHOPHOTO	SEPTEMBER, 1983
CONTOUR INTERVAL	1.0 metre

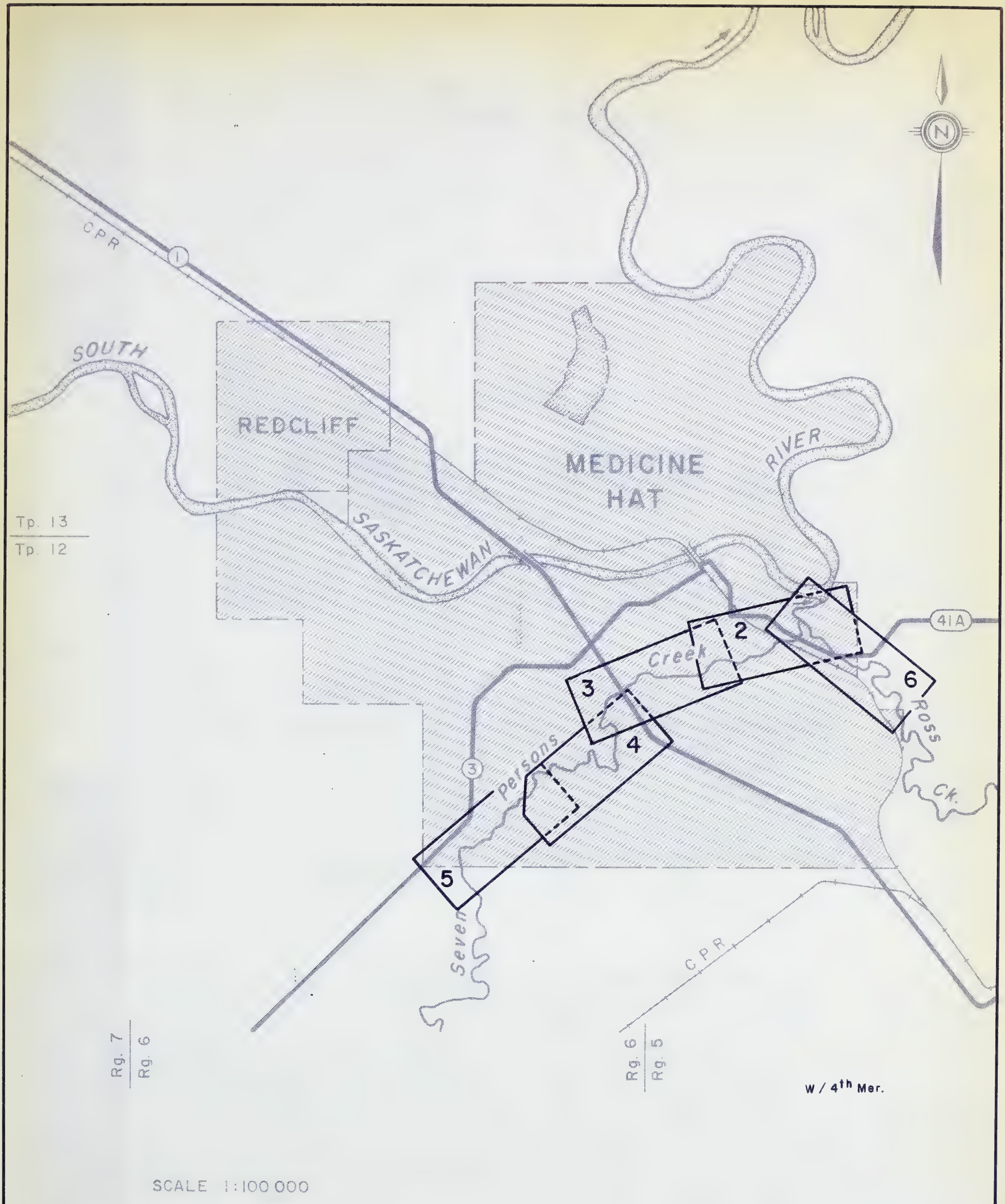
Alberta
ENVIRONMENT

Water Resources Management Service
Technical Services Division

MEDICINE HAT FLOODPLAIN STUDY

FLOOD RISK MAP – SOUTH SASKATCHEWAN RIVER

DRAWN BY: E Bernhauser	APPROVED BY: M. Chuazi	FIGURE 5
CHECKED BY: T. Winhold	DATE: May 1/86	SHEET 14 OF 14


N
CPR
1
SOUTH
REDCLIFF
MEDICINE HAT
SASKATCHEWAN
RIVER
Creek
2
3
4
5
6
Persons
Seven
Ross
Ck.
41A
3
CPR
Tp. 13
Tp. 12
Rg. 7
Rg. 6
Rg. 6
Rg. 5
W / 4th Mer.

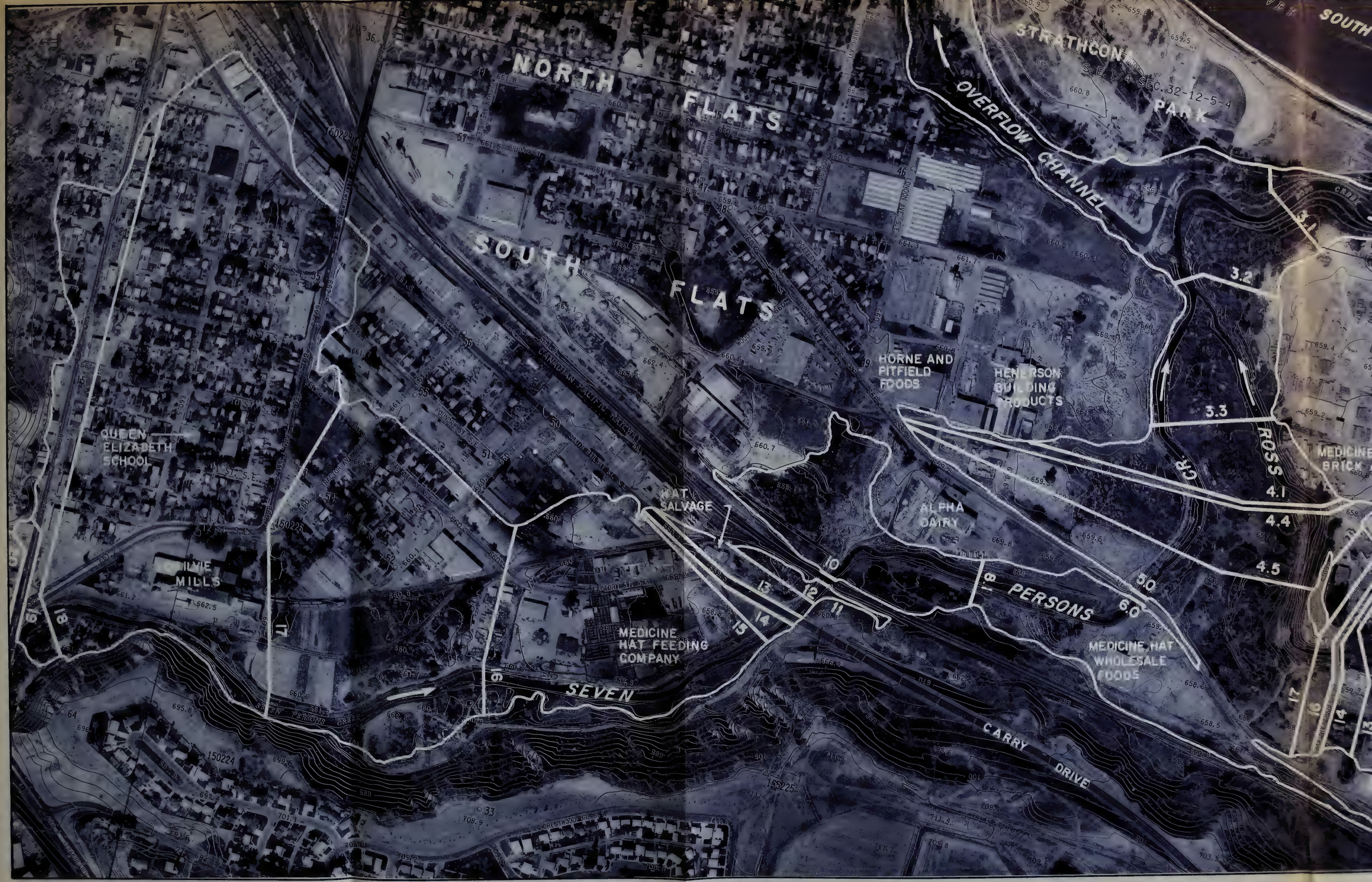
SCALE 1:100 000

Alberta
ENVIRONMENT
Water Resources Management Service
Technical Services Division

MEDICINE HAT FLOODPLAIN STUDY

FLOOD RISK MAPS - INDEX PLAN
ROSS CREEK AND SEVEN PERSONS CREEK

DRAWN BY : B. Sanders	APPROVED BY : M. Quazi	FIGURE No. 6
CHECKED BY : T. Wuitchold	DATE : May 1/86	SHEET 1 OF 6


NORTH FLATS
SOUTH FLATS
STRATHCONA PARK
S.E. 1/4 SEC. 32-12-5-4
OVERFLOW CHANNEL
SOUTH
QUEEN ELIZABETH SCHOOL
OGILVIE MILLS
CANADIAN PACIFIC RAILWAY
HAT SALVAGE
HORNE AND PITFIELD FOODS
HENDERSON BUILDING PRODUCTS
ALPHA DAIRY
MEDICINE HAT FEEDING COMPANY
MEDICINE HAT WHOLESALE FOODS
MEDICINE BRICK
SEVEN
PERSONS
ROSS
CR.
CARRY DRIVE
3.1
3.2
3.3
4.1
4.4
4.5
5.0
6.0
8
10
11
12
13
14
15
16
17
18
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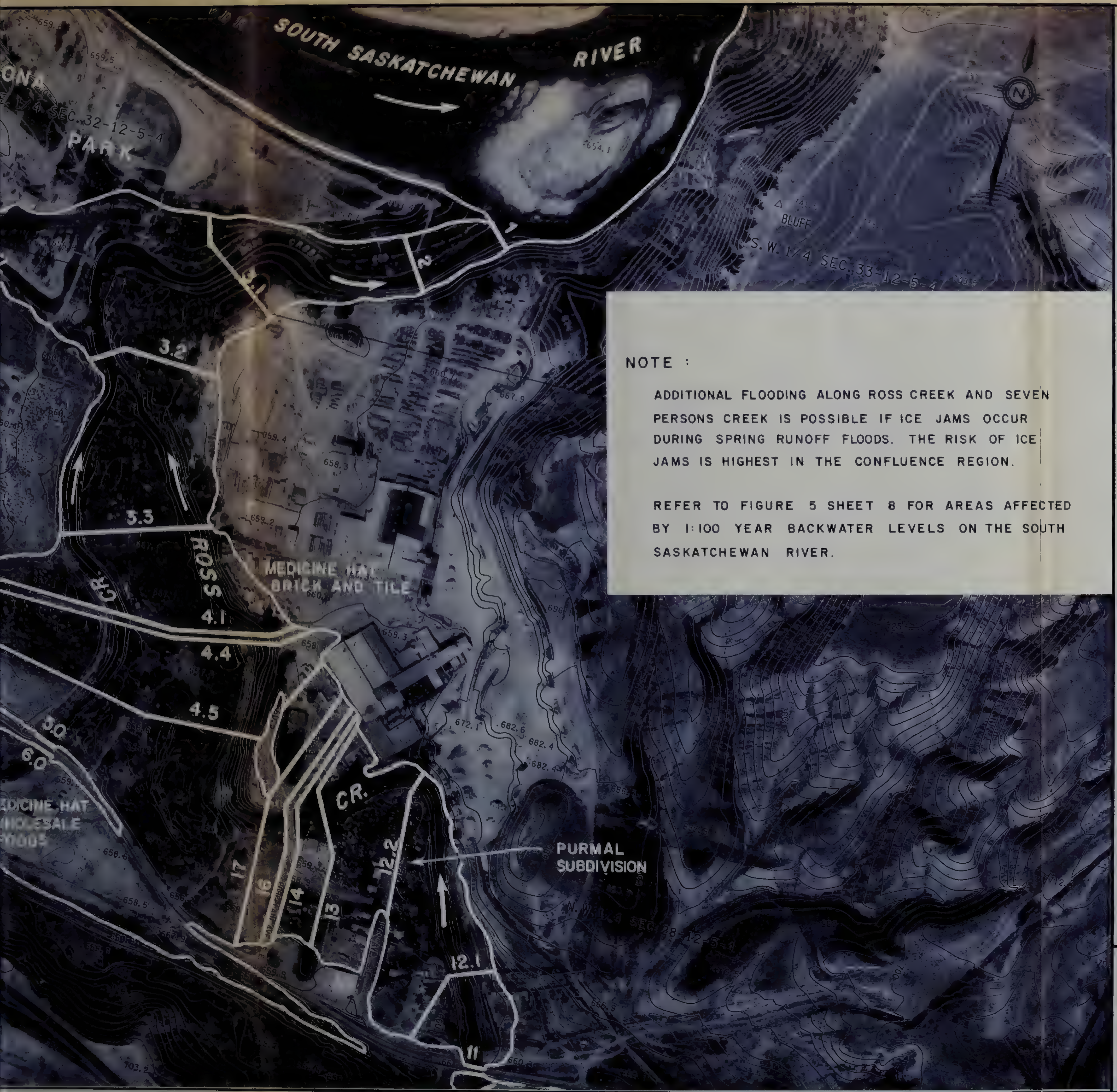
150229
150225
150224
155225


SOUTH SASKATCHEWAN RIVER
SEC.32-12-5-4
PARK
659.5
654.1
BLUFF
S.W. 1/4 SEC.33-12-5-4
1
2
3.2
3.3
ROSS CR.
MEDICINE HAT BRICK AND TILE
4.1
4.4
4.5
5.0
6.0
CR.
667.9
659.4
658.3
659.2
659.3
672.1
682.6
682.4
PURMAL SUBDIVISION
EDICINE HAT
HOLESALE
FOODS
658.5
17
16
14
13
12.2
12.1
11

NOTE :

ADDITIONAL FLOODING ALONG ROSS CREEK AND SEVEN PERSONS CREEK IS POSSIBLE IF ICE JAMS OCCUR DURING SPRING RUNOFF FLOODS. THE RISK OF ICE JAMS IS HIGHEST IN THE CONFLUENCE REGION.

REFER TO FIGURE 5 SHEET 8 FOR AREAS AFFECTED BY 1:100 YEAR BACKWATER LEVELS ON THE SOUTH SASKATCHEWAN RIVER.

Water Resources

LEGEND

～	1:100 YEAR FLOOD RISK LIMITS
35	CROSS-SECTION LOCATION AND NUMBER

0 100 200 300 400 500 m

SCALE 1:5000

* BASE MAPPING PRODUCED BY THE ALBERTA BUREAU OF SURVEYING AND MAPPING, 1984.

ORTHOPHOTO	SEPTEMBER, 1983
CONTOUR INTERVAL	1.0 metre

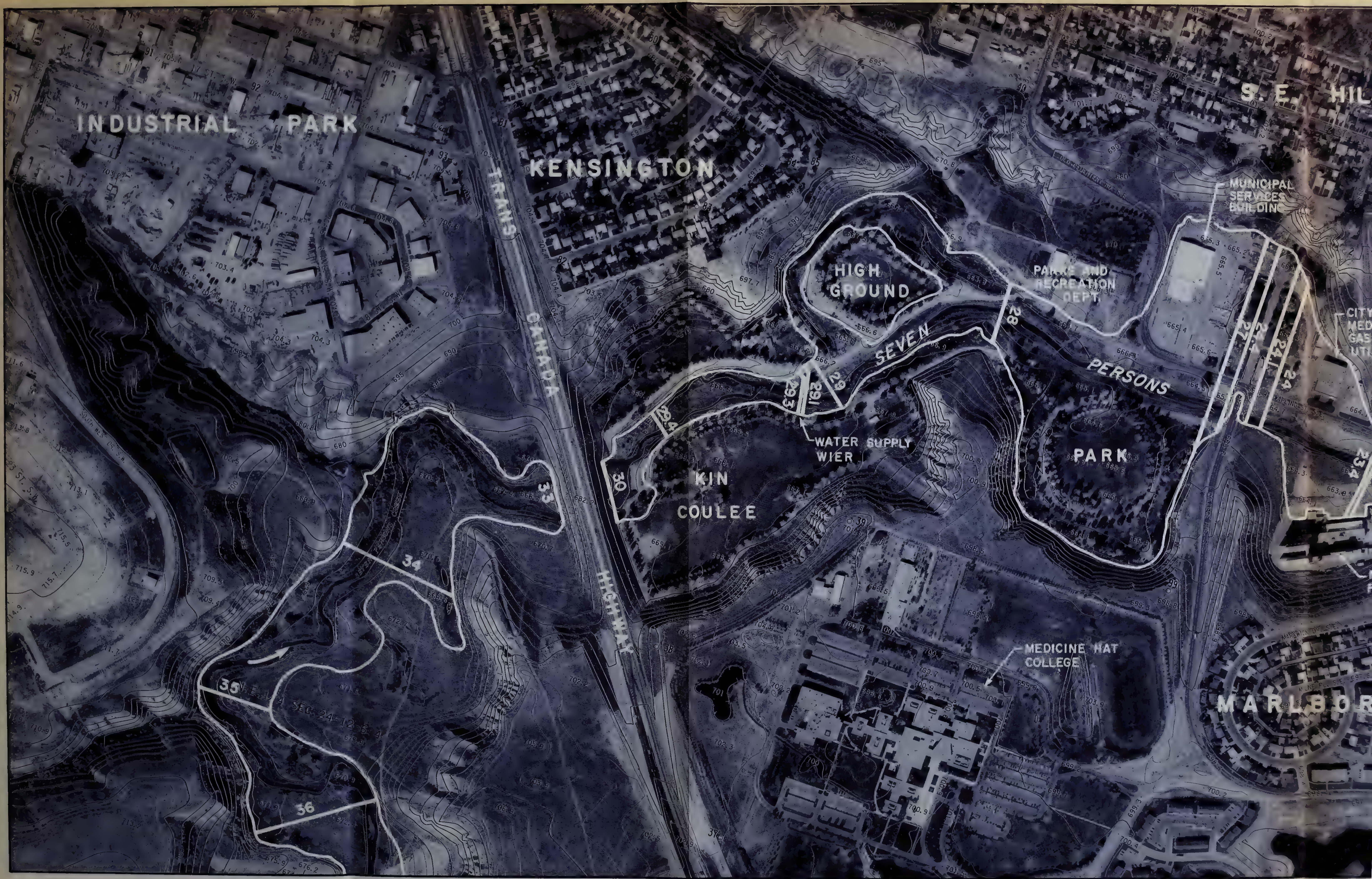
MEDICINE HAT FLOODPLAIN STUDY

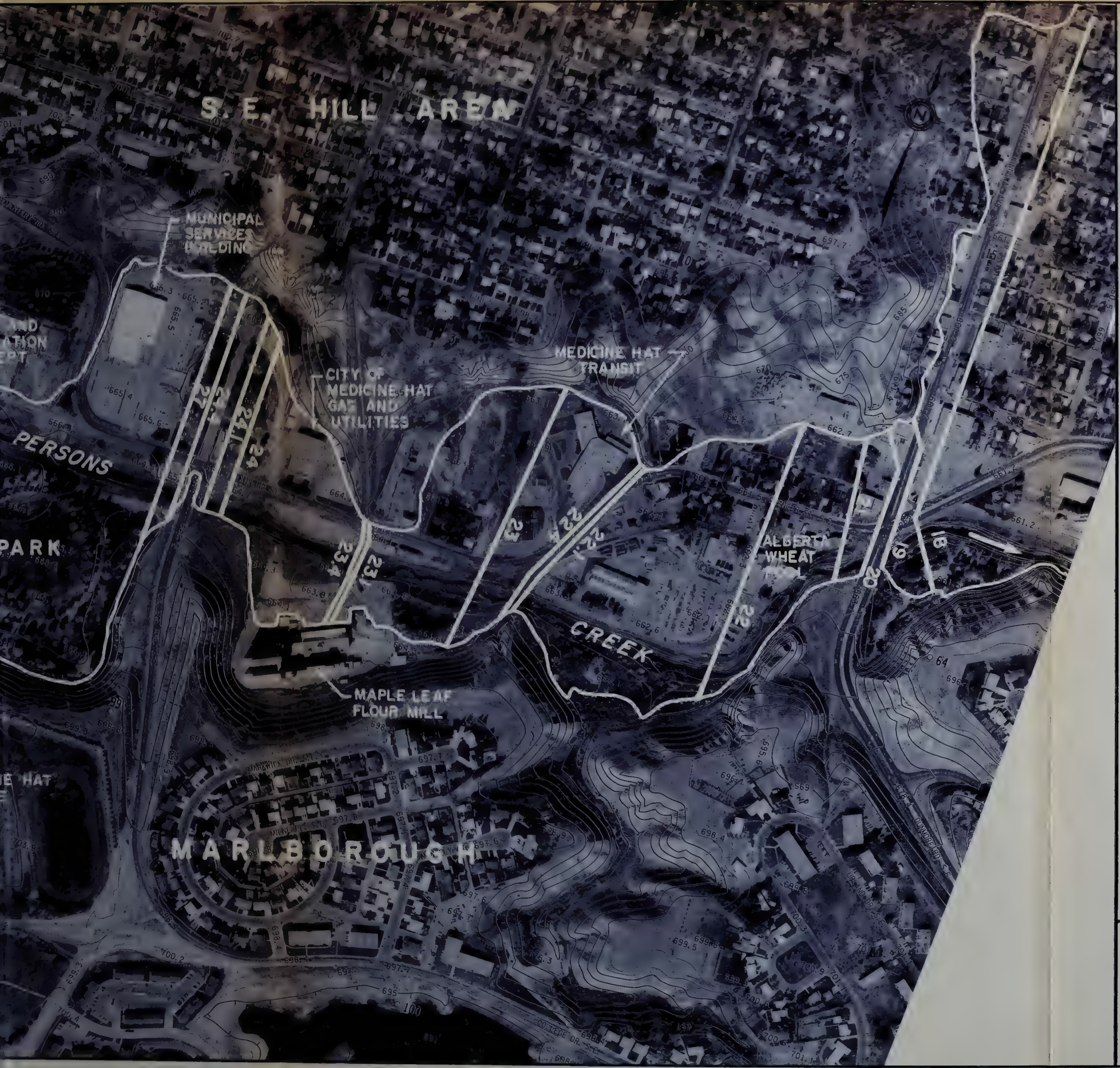
FLOOD RISK MAP –
SEVEN PERSONS CREEK

Alberta
ENVIRONMENT

Water Resources Management Service
Technical Services Division

DRAWN BY: E Bunhauser	APPROVED BY: M. Chan	FIGURE 6
CHECKED BY: T. Whitold	DATE: May 1/86	SHEET 2 OF 6


INDUSTRIAL PARK
KENSINGTON
TRANS CANADA HIGHWAY
S. E. HIL
MUNICIPAL SERVICES BUILDING
HIGH GROUND
PARKS AND RECREATION DEPT.
CITY
MED
GAS
UTI
SEVEN PERSONS
28
29
29.1
29.3
29.4
30
33
34
35
36
24
24.1
WATER SUPPLY WIER
KIN COULEE
PARK
MEDICINE HAT COLLEGE
MARLBOR
SEC 24-12-5-4


S. E. HILL AREA
MUNICIPAL SERVICES BUILDING
CITY OF MEDICINE HAT GAS AND UTILITIES
MEDICINE HAT TRANSIT
PERSONS
CREEK
PARK
MAPLE LEAF FLOUR MILL
ALBERTA WHEAT POOL
MARLBOROUGH
18
19
20
21
22
22.1
22.2
23
23.1
23.4
24
24.1
24.2
N

Water Resources

LEGEND

	1:100 YEAR FLOOD RISK LIMITS
35	CROSS-SECTION LOCATION AND NUMBER

0 100 200 300 400 500 m

SCALE 1:5000

* BASE MAPPING PRODUCED BY THE ALBERTA BUREAU OF SURVEYING AND MAPPING, 1984.

ORTHOPHOTO	SEPTEMBER, 1983
CONTOUR INTERVAL	1.0 metre

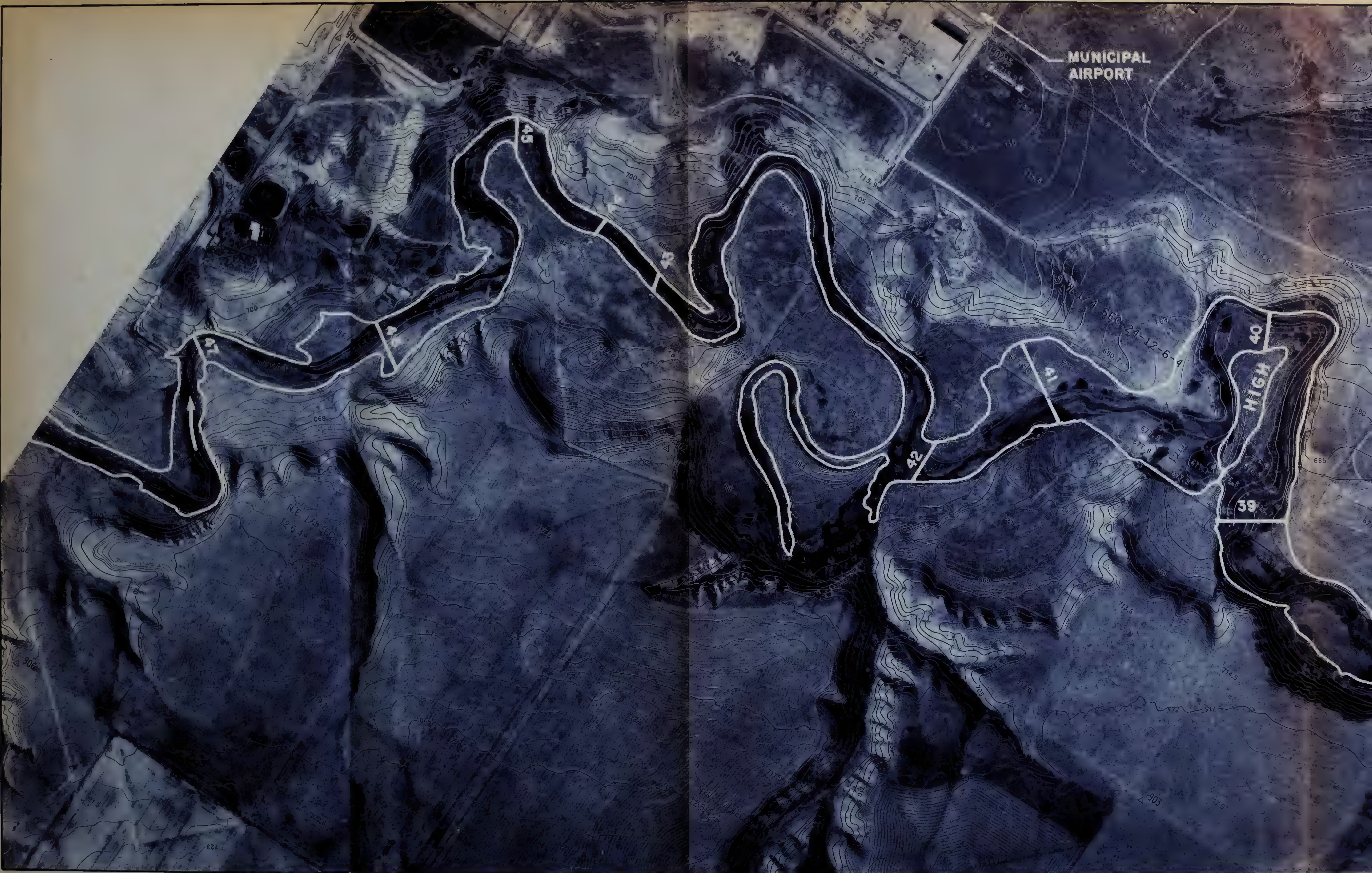
Alberta
ENVIRONMENT

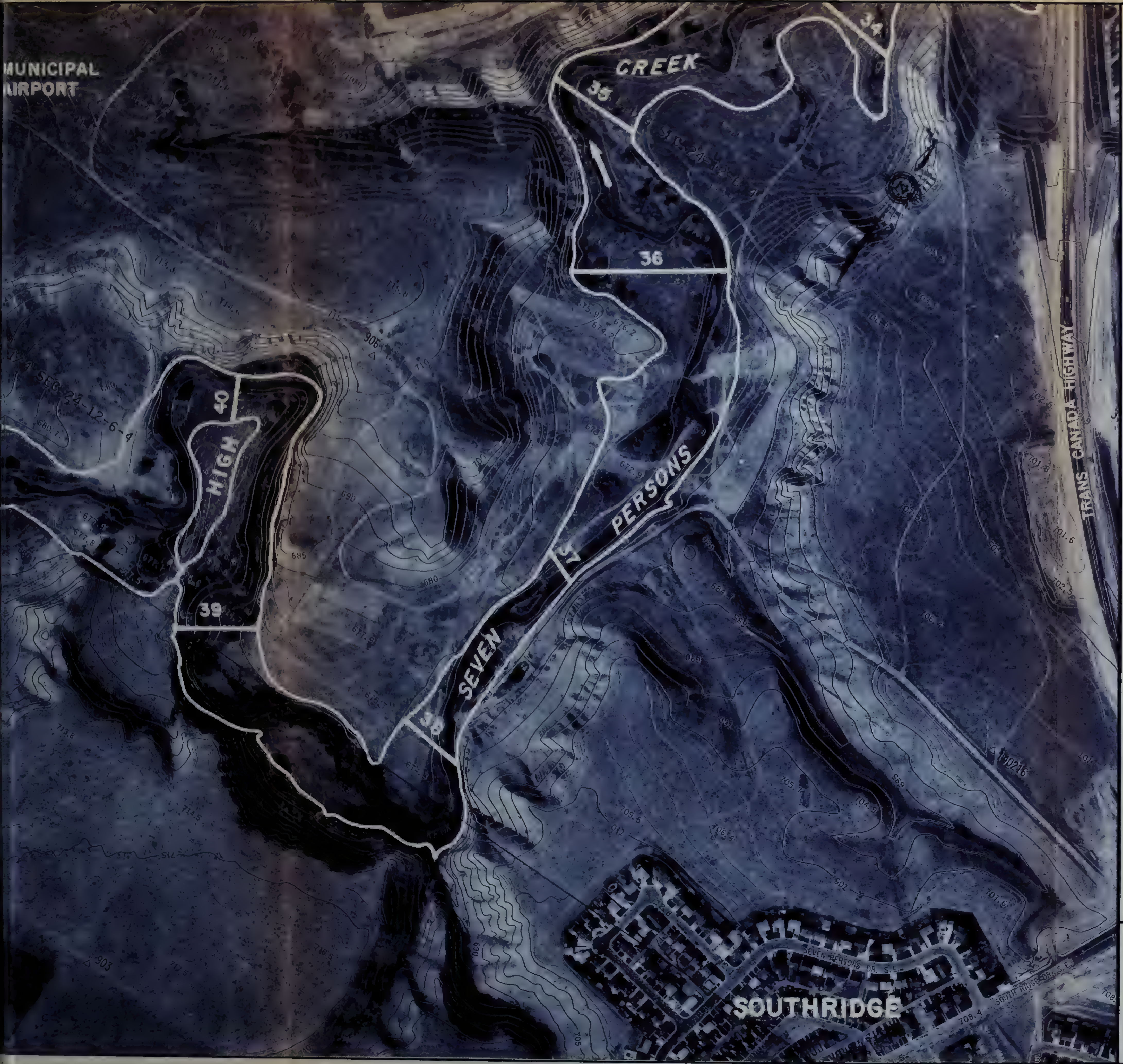
Water Resources Management Service
Technical Services Division

MEDICINE HAT FLOODPLAIN STUDY

FLOOD RISK MAP – SEVEN PERSONS CREEK

DRAWN BY: E. Bernhauser	APPROVED BY: M. Chanagi	FIGURE 6
CHECKED BY: T. Winhold	DATE: May 1/86	SHEET 3 OF 6


MUNICIPAL AIRPORT
47
44
45
43
42
41
40
39
HIGH
S.W. 1/4 SEC. 24-12-6-4
N.E. 1/4 SEC.
12-6-4


MUNICIPAL
AIRPORT
CREEK
34
35
36
37
38
39
40
HIGH
SEVEN
PERSONS
SEC-24-12-6-4
TRANS CANADA HIGHWAY
SEVEN PERSONS DR. S.E.
SOUTH RIDGE DR. S.E.
SOUTHRIDGE

Water Resources

LEGEND

━	1:100 YEAR FLOOD RISK LIMITS
35	CROSS-SECTION LOCATION AND NUMBER

0 100 200 300 400 500 m

SCALE 1:5000

* BASE MAPPING PRODUCED BY THE ALBERTA BUREAU OF SURVEYING AND MAPPING, 1984.

ORTHOPHOTO	SEPTEMBER, 1983
CONTOUR INTERVAL	1.0 metre

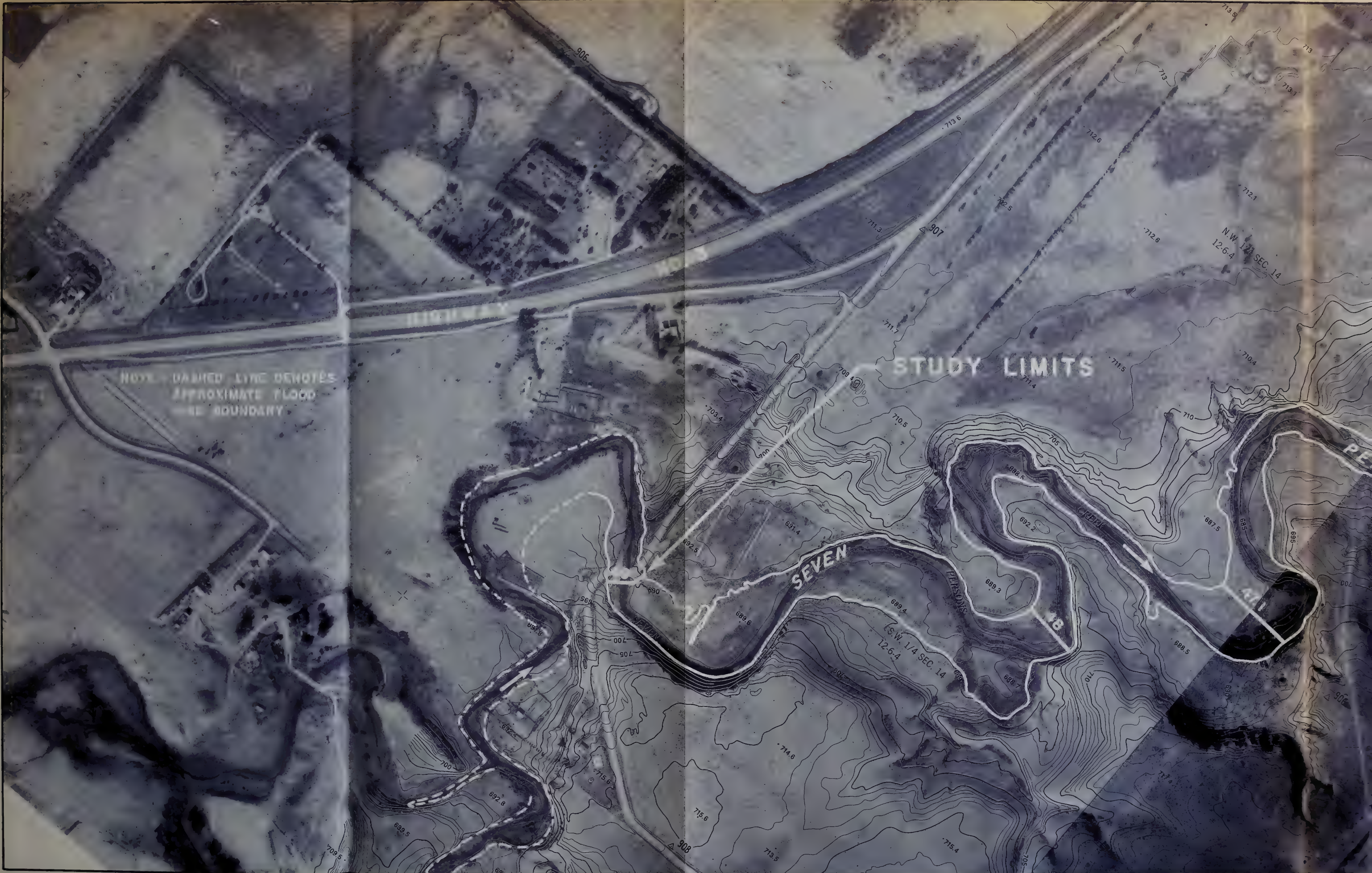
Alberta
ENVIRONMENT

Water Resources Management Service
Technical Services Division

MEDICINE HAT FLOODPLAIN STUDY

FLOOD RISK MAP - SEVEN PERSONS CREEK

DRAWN BY: E. Bernhauser	APPROVED BY: M. Ang	FIGURE 6
CHECKED BY: T. Winhold	DATE: May 1/86	SHEET 4 OF 6


NOTE - DASHED LINE DENOTES
APPROXIMATE FLOOD
ZONE BOUNDARY
HIGHWAY NO. 3
STUDY LIMITS
SEVEN PERSONS CREEK
SEVEN
N.W. 1/4 SEC. 14
12-6-4
S.W. 1/4 SEC. 14
12-6-4
906
907
908
48
713.6
712.6
712.5
712.1
711.3
711.7
711.5
711.4
710.5
710.4
709.4
703.4
692.5
691.4
690
689.8
689.4
689.3
688.5
688.7
692.2
687.5
699.5
692.8
715.6
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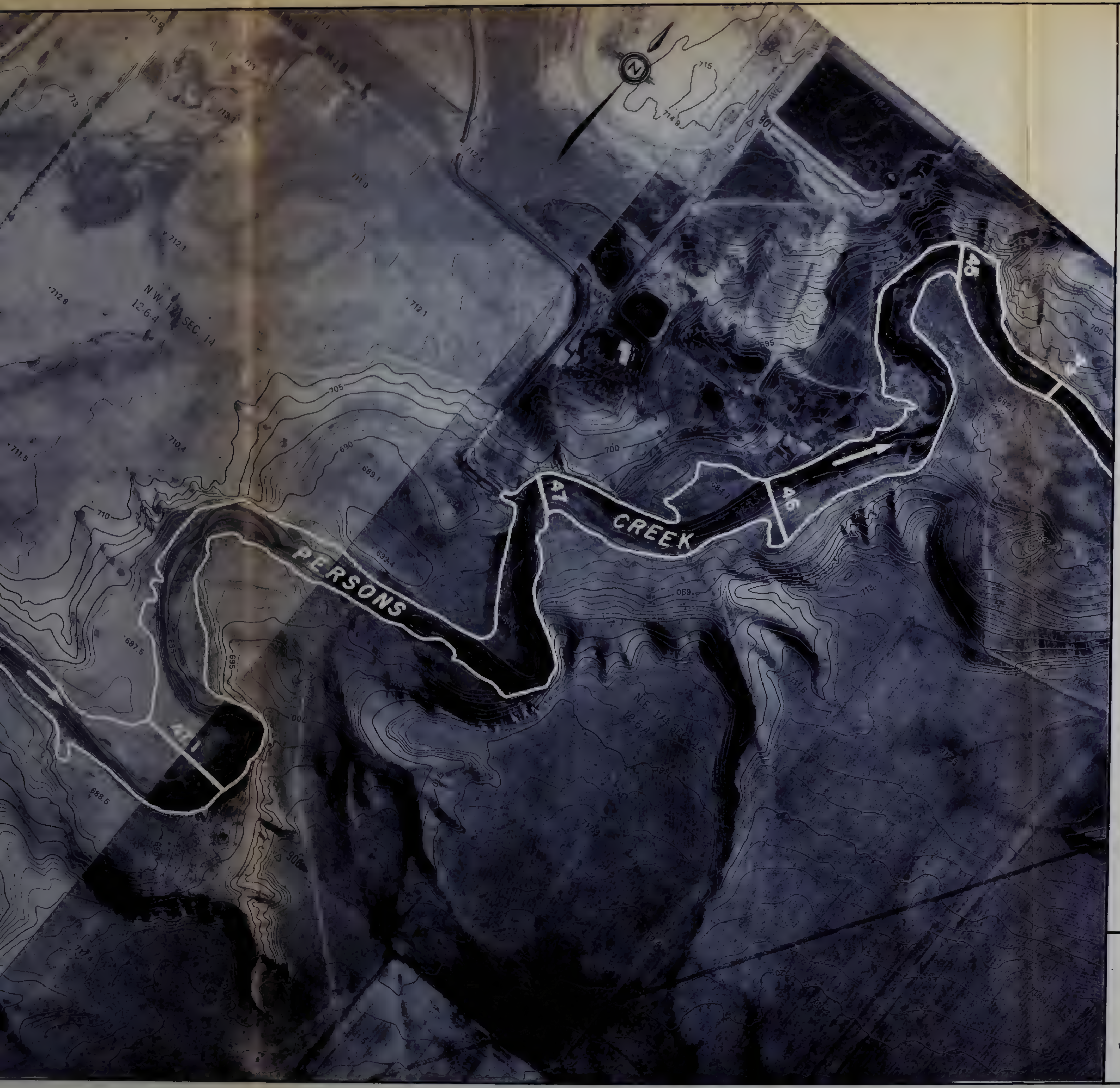
700
710
713
713.1


N
PERSONS
CREEK
47
46
45
N.W. 1/4 SEC. 14
12-6-4
N.E. 1/4 SEC. 14
12-6-4
705
700
690
695
710
712.1
712.6
711.5
710.4
689.1
687.5
688.5
715
714.9
712.4

Water Resources

LEGEND

▨ 1:100 YEAR FLOOD RISK LIMITS

35 CROSS-SECTION LOCATION AND NUMBER

0 100 200 300 400 500 m

SCALE 1:5000

* BASE MAPPING PRODUCED BY THE ALBERTA BUREAU OF SURVEYING AND MAPPING, 1984.

ORTHOPHOTO	SEPTEMBER, 1983
CONTOUR INTERVAL	1.0 metre

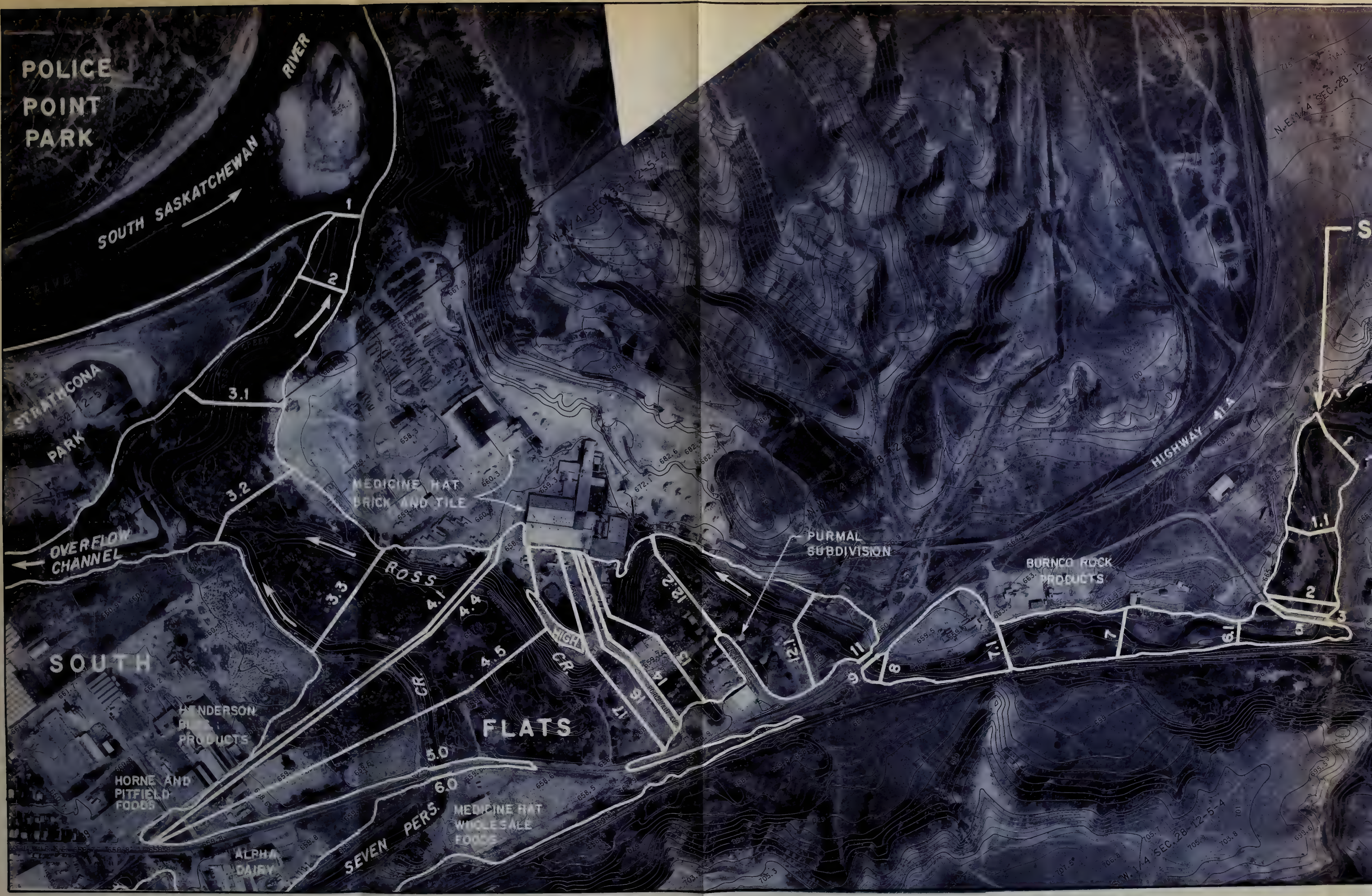
Alberta
ENVIRONMENT

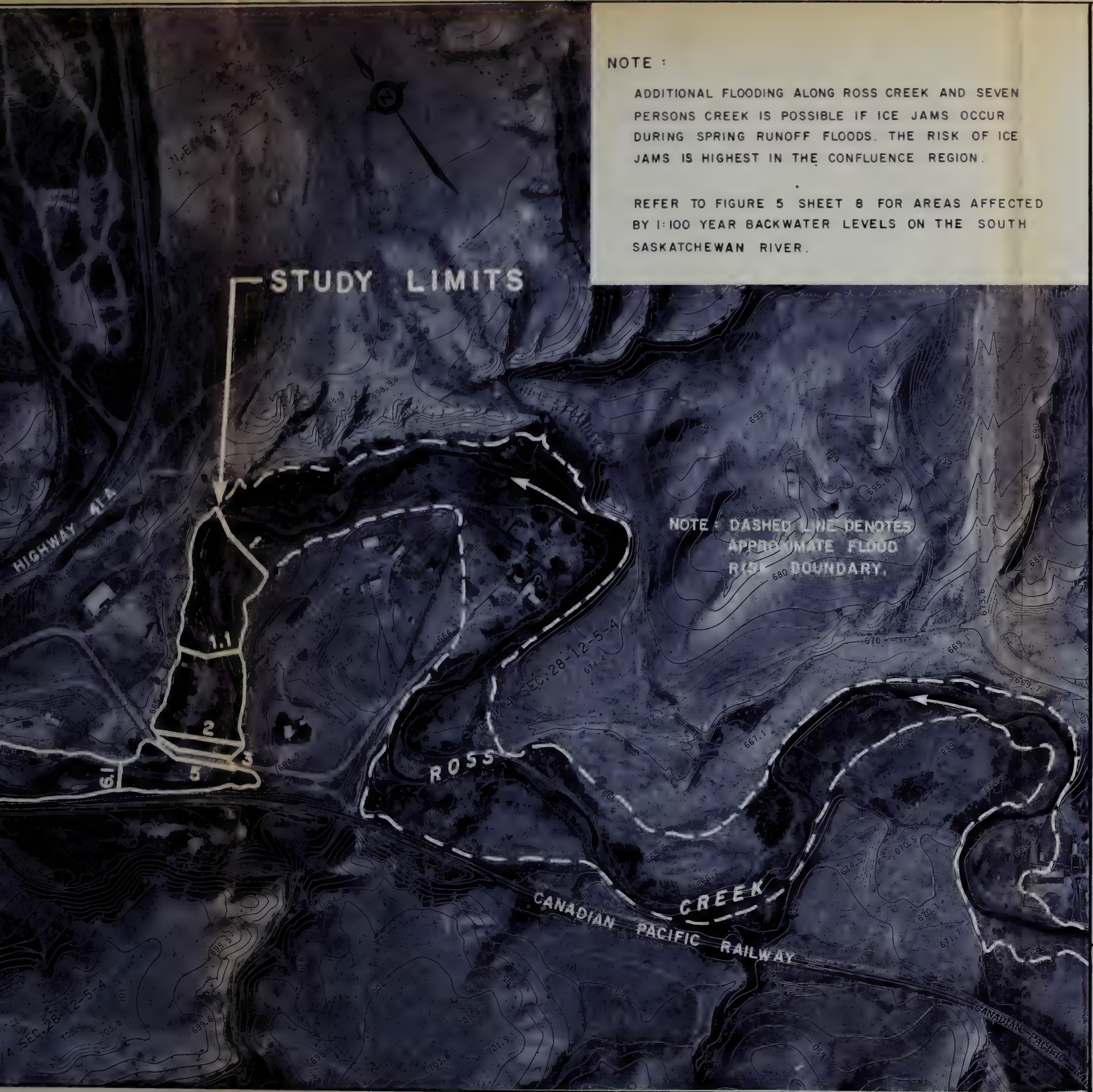
Water Resources Management Service
Technical Services Division

MEDICINE HAT FLOODPLAIN STUDY

FLOOD RISK MAP –
SEVEN PERSONS CREEK

DRAWN BY: C Bernhauser
APPROVED BY: M. [illegible]
CHECKED BY: T. [illegible]
DATE: May 1/86
FIGURE 6
SHEET 5 OF 6


POLICE POINT PARK
SOUTH SASKATCHEWAN RIVER
RIVER
STRATHCONA PARK
SEC. 32-12-5-4
N.W.1/4 SEC.33-12-5-4
N.E.1/4 SEC.28-12-5
N.W.1/4 SEC.28-12-5-4
S.W.1/4 SEC.28-12-5-4
HIGHWAY 41A
OVERFLOW CHANNEL
ROSS CR.
HIGH
MEDICINE HAT BRICK AND TILE
PURMAL SUBDIVISION
BURNCO ROCK PRODUCTS
SOUTH FLATS
HENDERSON PIPE PRODUCTS
HORNE AND PITFIELD FOODS
ALPHA DAIRY
SEVEN PERS. CR.
MEDICINE HAT WHOLESALE FOODS
1
2
3.1
3.2
3.3
4.1
4.4
4.5
5.0
6.0
12.2
12.1
11
9
8
7.1
7
6.1
5
3
2
1.1
S


STUDY LIMITS
HIGHWAY 41A
1.1
2
3
5
6.1
ROSS CREEK
CANADIAN PACIFIC RAILWAY
NE 1/4 SEC. 28-12-5-4
SEC. 28-12-5-4
1/4 SEC. 28-12-5-4
CANADIAN PACIFIC

NOTE : DASHED LINE DENOTES APPROXIMATE FLOOD RISE BOUNDARY.

NOTE :

ADDITIONAL FLOODING ALONG ROSS CREEK AND SEVEN PERSONS CREEK IS POSSIBLE IF ICE JAMS OCCUR DURING SPRING RUNOFF FLOODS. THE RISK OF ICE JAMS IS HIGHEST IN THE CONFLUENCE REGION.

REFER TO FIGURE 5 SHEET 8 FOR AREAS AFFECTED BY 1:100 YEAR BACKWATER LEVELS ON THE SOUTH SASKATCHEWAN RIVER.

Water Resources

LEGEND

1:100 YEAR FLOOD RISK LIMITS

10 CROSS-SECTION LOCATION AND NUMBER

0 100 200 300 400 500 m

SCALE 1:5000

* BASE MAPPING PRODUCED BY THE ALBERTA BUREAU OF SURVEYING AND MAPPING, 1984.

ORTHOPHOTO SEPTEMBER, 1983
CONTOUR INTERVAL 1.0 metre

Alberta
ENVIRONMENT

Water Resources Management Service
Technical Services Division

MEDICINE HAT FLOODPLAIN STUDY

FLOOD RISK MAP - ROSS CREEK

DRAWN BY: E Bernhauser	APPROVED BY: M. Quazi	FIGURE 6
CHECKED BY: T. Winhold	DATE: May 1/86	SHEET 6 OF 6

APPENDIX A

Newspaper Accounts of Past Flooding at Medicine Hat

The following are selected excerpts from news reports which appeared in the Medicine Hat News and the Calgary Herald:

1902: Summer Flood on the South Saskatchewan River.

"The Saskatchewan River, which a little over a month ago rose to such a height that the oldest settlers in this neighborhood declared they had never seen it so high before, has once again repeated this occurrence, this time beating her previous record, having been fully two feet higher than on the former occasion.

Friday morning the river, already high, commenced to steadily rise and by Saturday morning the larger part of the flats adjacent to the town were submerged ... Several families on the flats were compelled to move out, the water being so high that it was running in the windows of the houses.

The C.P.R. tracks, east of the Seven Persons bridge was also under water and by Sunday morning quite a stretch of it had washed away."

- Medicine Hat News, July 10, 1902

1951: Ice Jam on the South Saskatchewan River

"A six-bomb aerial barrage today failed to budge an ice jam in the South Saskatchewan River and as flood waters continued to pour over the banks into Medicine Hat plans were made to hit the blockade with a 1,000 pound delayed-action bomb ... SCENE OF THE bombing and ice bridge is 5 1/2 miles downstream of the city proper ... AT ITS PEAK Thursday afternoon the flood water swept into about 60 homes and a technical school annex housing $30,000 worth of machinery. Six families were evacuated as the city's recently-organized civil defence organization went into action. The flood for a time threatened the city's water system and sand bag crews were mustered to protect the plant from flooding water."

- Calgary Herald, March 30, 1951

"The river level through the city proper remained constant all Friday, two feet below Thursday's peak, but in the low-lying flats sector the level was back to within six inches of the critical flood peak. This situation was brought about by torrents of water pouring down Ross and Seven Persons Creeks which empty into the river at the Purmal subdivision. Ice blocks at the creek exits were dynamited yesterday afternoon and the extra burden of water backed up the river and over the Purmal and flats sectors."

- Medicine Hat News, March 31, 1951

"The army Sunday took over from the R.C.A.F. in an effort to break a massive ice jam in the South Saskatchewan River that has caused serious flooding in the City.

More than 63 homes have been flooded and twelve families have been evacuated since the flood started Thursday."

- Calgary Herald, April 2, 1951

"Meanwhile, the danger of further river flooding has disappeared, but runoff waters cascading down Seven Persons Creek remain a threat. The creek came up again last night to Saturday's flood crest, and receded today. These waters back up over the Purmal subdivision and Saratoga Park, the latter including Medicine Hat feedlots".

- Medicine Hat News, April 2, 1951

"Purmal subdivision is perhaps the worst hit part of the city with flood waters covering some half dozen homes from depths of 18 inches to six feet, cutting off the road north from the Medicine Hat Brick and Tile plant ...

It has been the worst flood situation in Medicine Hat since June of 1923 when the river went up some 20 feet over normal spring flow.

The ice floe extends from the scene of the demolition work to a point some 15 miles upstream, but there are several open stretches of water in the run. One occurs near the power house, due to the warm water emptied from the plant's steam generators."

- Medicine Hat News, April 3, 1951

"AT MEDICINE HAT, meanwhile, the South Saskatchewan was flowing freely for the first time since last Thursday after two mighty dynamite blasts broke the grip of a 16-mile jam and sent it grinding downstream ... Twenty blocks were flooded last Thursday when the jam flooded with the spring breakup."

- Calgary Herald, April 4, 1951

1952: Spring Flood on Seven Persons Creek

"Spring run-off flood waters poured down Seven Persons Creek at Medicine Hat like a tidal wave today, forcing an estimated 500 people to leave their homes early this morning ... THE RISE of the Seven Persons Creek to what old-timers said was two feet higher than the previous record level climaxed a weekend in which almost the entire city's attention was drawn to floods.

A NORMALLY QUIET stream that usually dries before summer's end caused worse flood conditions in Medicine Hat Sunday than the South Saskatchewan River caused there last year ... by dawn this morning its waters had spread up to six blocks wide where it winds along the southern section of the city until flowing into the South Saskatchewan.

CITY WORKS department vehicles, the fire department boat and private trucks were used to evacuate residents, mainly from Kipling, Marshall, Spencer, and Mill Streets and Allowance Avenue.

A school in the area has been closed and high waters are keeping workers away from two flour mills. A number of other small industries are expected to be shut down."

- Calgary Herald, March 31, 1952

"The normally peaceful Seven Persons Creek turned savage last night and early this morning, violently spewing all-time record flood waters over the southern section of the city. Before it slowed its pace this morning it forced an estimated 1,000 persons to flee their homes. It caused damages that along with the first four minor flood days may reach as high as $100,000. Fifteen city blocks were covered with water.

Hundreds of homes in the triangle from the Maple Leaf [flour mills], to Beaver Lumber to the Medicine Hat Feedlots were inundated. The great majority suffered flooded basements, some containing basement apartments, and some on very low ground had water in the first floor of the home.

Police were called in to keep traffic moving as water began surging over Kipling and Marshall Streets."

- Medicine Hat News, March 31, 1952

"Caused by record spring runoffs, one of the worst floods in the city's history ended this week, leaving behind the long grim task of cleaning up the ravages caused by high waters from the Ross and Seven Persons Creeks. As the creeks returned to their banks they left personal damages totalling some $200,000; swept out one road bridge and battered another until it had to be condemned; shut or slowed down industrial plants; blocked highways and railroads in the district and tore large patches off city streets. Some 255 homes had to be evacuated, forcing about 1,000 people to find shelter."

- Medicine Hat News, April 5, 1952

1953: Summer Flood on the South Saskatchewan River

"This gas city of Southern Alberta spent an apprehensive night, as the angry South Saskatchewan River hissed and bubbled its way along at 11 feet above its normal level, flooding the sparsely populated Purmal subdivision and swamping the basements of other homes along the bank ... About 20 families living in the Purmal subdivision were evacuated during the night, when city officials estimated they might not be able to hold the water in check.

ON RIVERSIDE, a residential district on the north bank of the South Saskatchewan River, a number of basements were full of overflow and the inhabitants could never remember the water being higher. However, only two families were forced to evacuate.

Figures regarding the rise and rate of rise of previous Medicine Hat floods are not obtainable, but that this is the worst series of inundations in 30 years is quite apparent ... BETWEEN 6 and 7 A.M. Thursday, however, the peak appeared to have been reached with a rise of only one inch being recorded. At that time, the river had risen to within 10 inches of the estimated top level of 30 feet predicted Wednesday by the Calgary Water Resources Department. the normal June level for the river is about 18 feet at Finlay bridge at the centre of The Hat, thus there has been a total actual rise of about 11 feet."

- Calgary Herald, June 11, 1953

"A turn in the flood crest started at noon today, with peak flow subsiding slowly after the high point of 29.19 had been maintained some four hours.

Flood waters were within six inches, for a few hours this morning, of knocking the city's power plant and waterworks system out of commission for an indefinite time.

Flood waters in the Purmal district covered the traffic bridge on Industrial Avenue with some two feet of water ... The C.P.R. spur line to the Medicine Hat Brick and Tile Co. plant was under a foot of water.

At the same hour water spread widely inland in the Athletic Park area, covering Lions Park and forcing three more families to flee their homes ... Loss at the [baseball] park is estimated at upwards of $10,000."

- Medicine Hat News, June 11, 1953

B

APPENDIX B

Flood Photographs

Included are captioned photographs taken during past flood events at Medicine Hat:

1951: Ice Jam Flood on the South Saskatchewan River (Photos 1 to 5).

1952: Spring Floods on Seven Persons Creek and Ross Creek (Photos 6 to 13).

1953: Summer Flood on the South Saskatchewan River (Photos 14 and 15).

1975: Summer Flood on the South Saskatchewan River (Photo 16).

1951 Flood Photographs

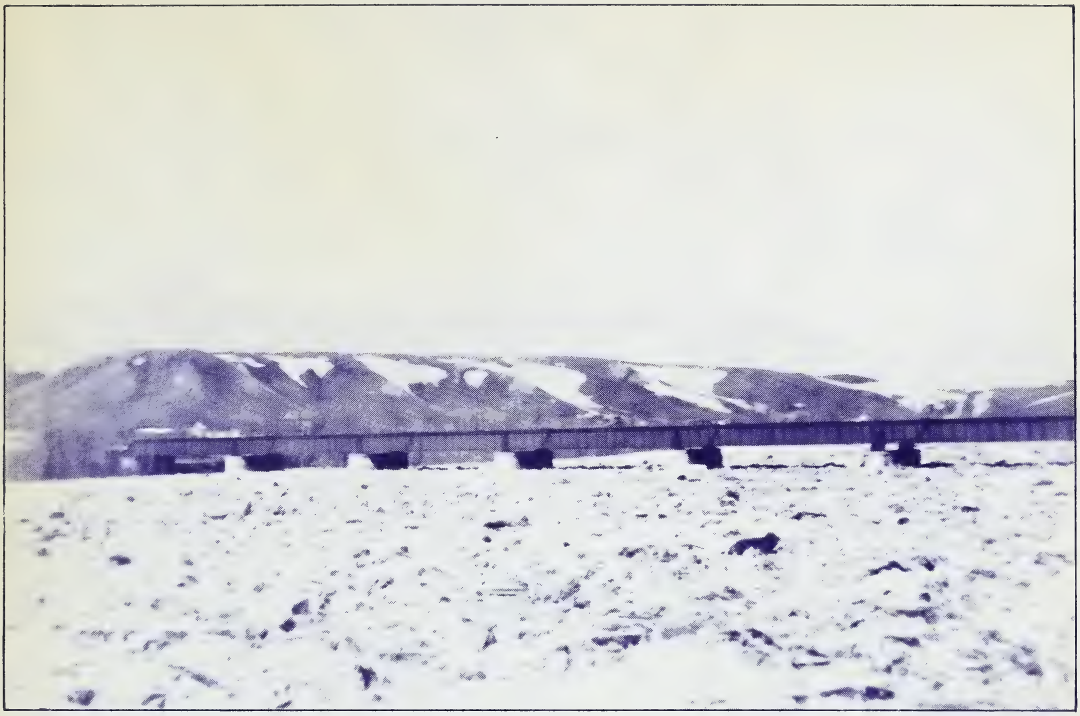


Photo 1: View of the ice choked South Saskatchewan River upstream of the Canadian Pacific Railway Bridge.

Date: March 29, 1951

Source: Medicine Hat Museum (A. Williams)

1951 Flood Photographs

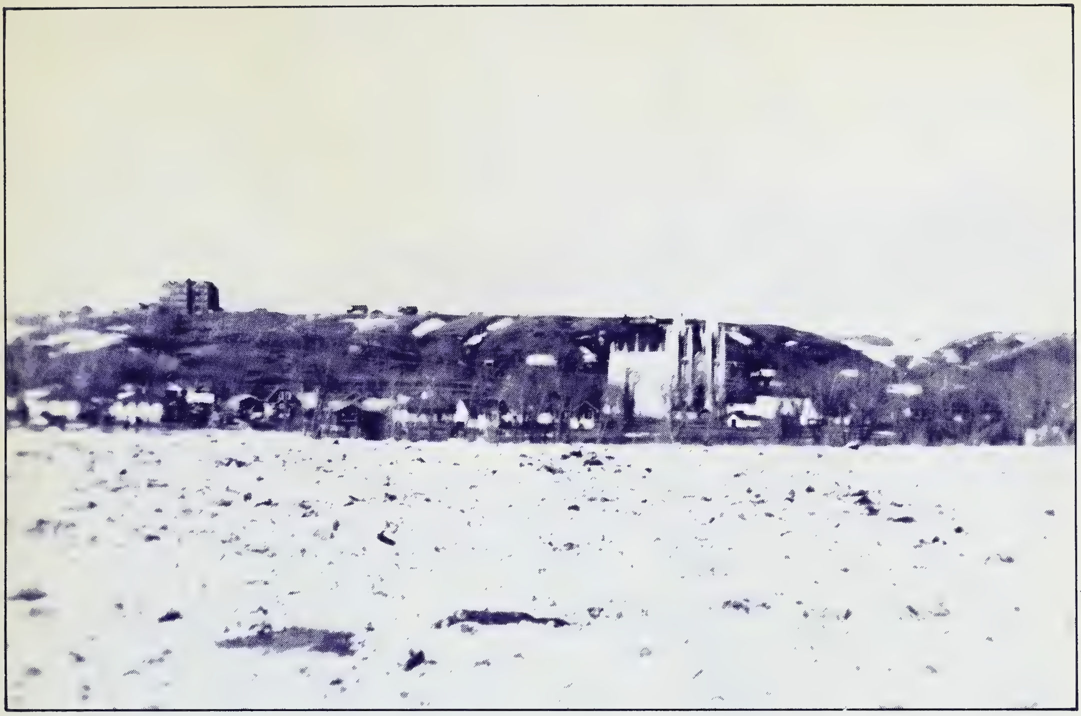


Photo 2: View of the ice choked South Saskatchewan River looking north to Crescent Heights past St. Patrick's Church.

Date: March 29, 1951

Source: Medicine Hat Museum (A. Williams)

1951 Flood Photographs

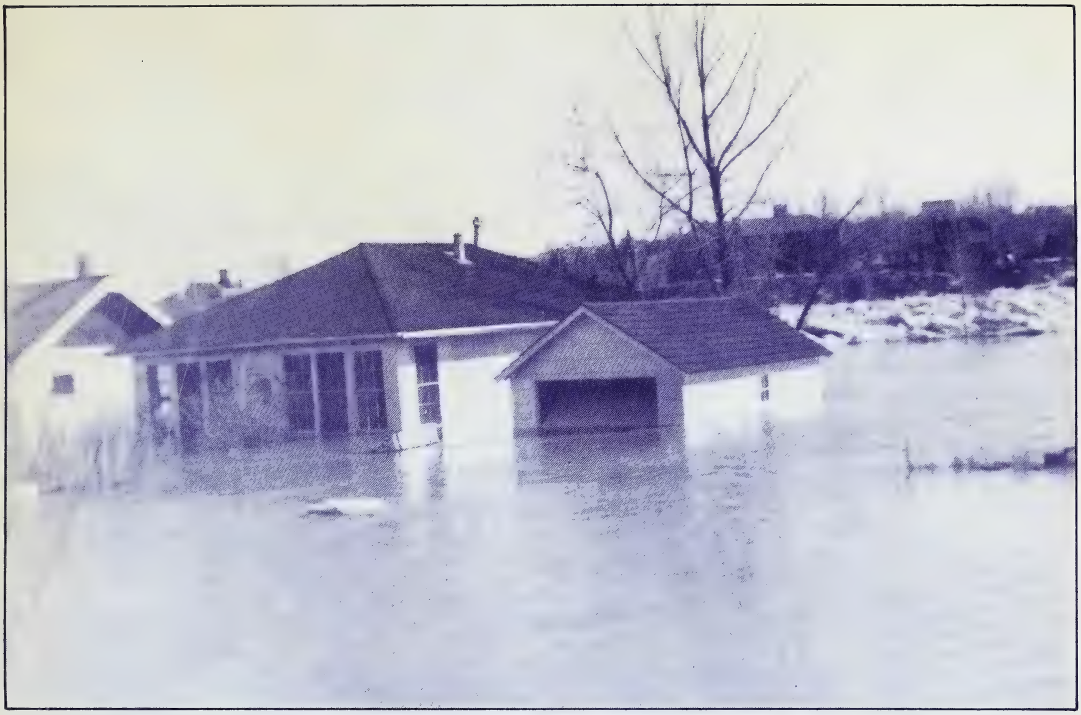


Photo 3: Flooding around former Lauder house at 179 - 1 Street, N.E. in the Riverside district. The ice choked South Saskatchewan River can be seen on the right side of the photo.

Date: March 29, 1951

Source: Medicine Hat Museum (A. Williams)

1951 Flood Photographs

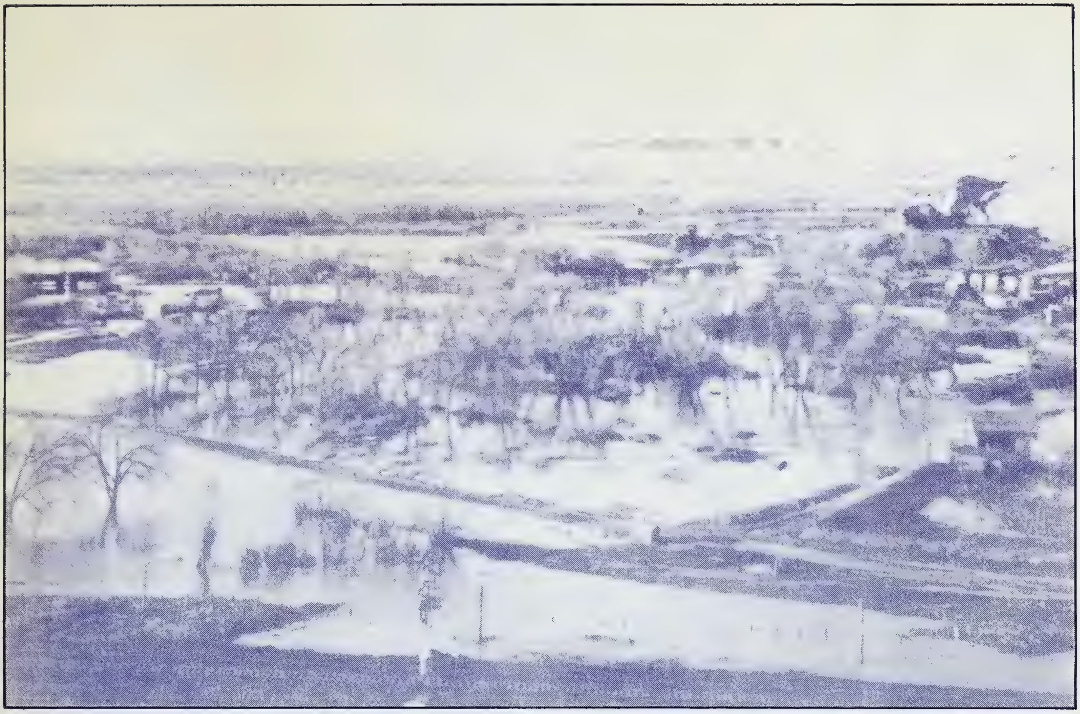


Photo 4: Backflooding in the confluence region. The South Saskatchewan River can be seen in the background. Industrial Avenue and the CPR mainline are in the foreground and the Purmal subdivision is on the right side of the photo.

Date: circa March 29, 1951

Source: Medicine Hat Museum (I-XL Industries)

1951 Flood Photographs

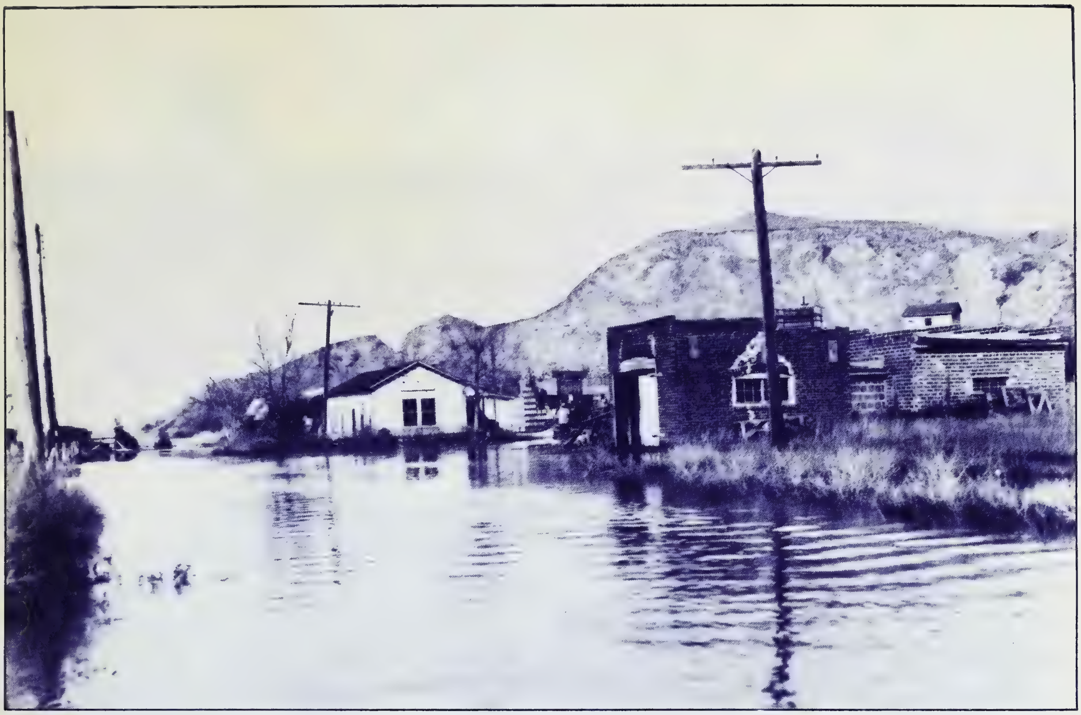


Photo 5: Backflooding around the Medicine Hat Brick and Tile Company (Purmal subdivision).

Date: circa March 29, 1951

Source: Medicine Hat Museum (I-XL Industries)

1952 Flood Photographs

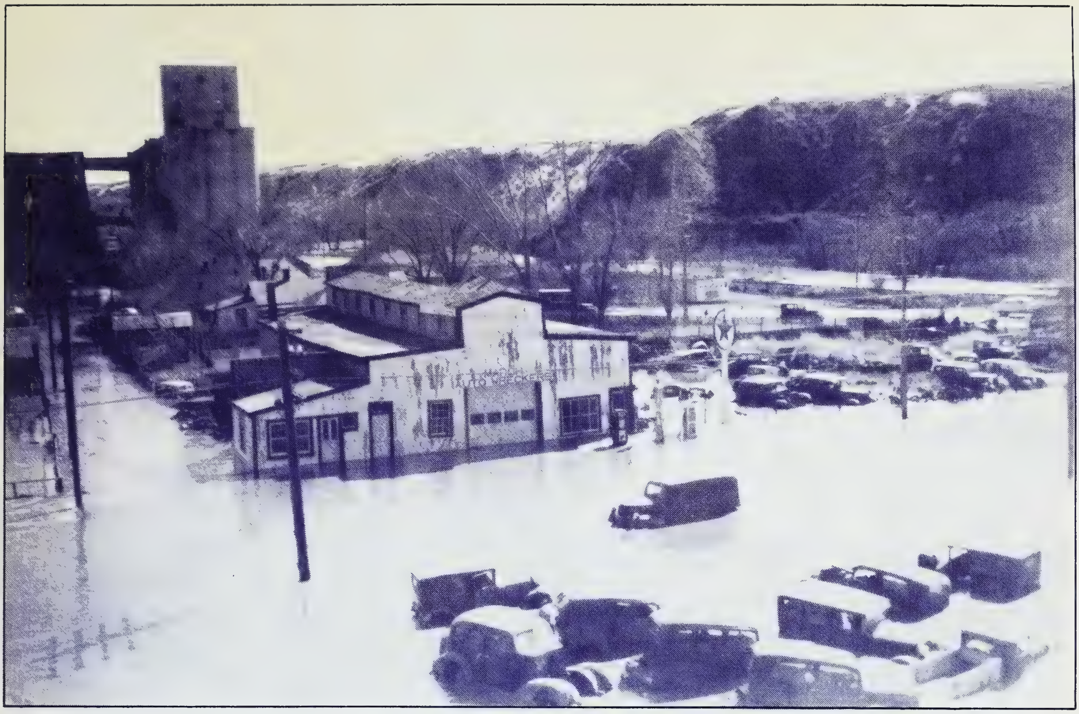


Photo 6: General view of flooding in the South Flats district east of Kingsway Avenue.

Date: circa March 31, 1952

Source: Medicine Hat Museum (A. Williams)

1952 Flood Photographs

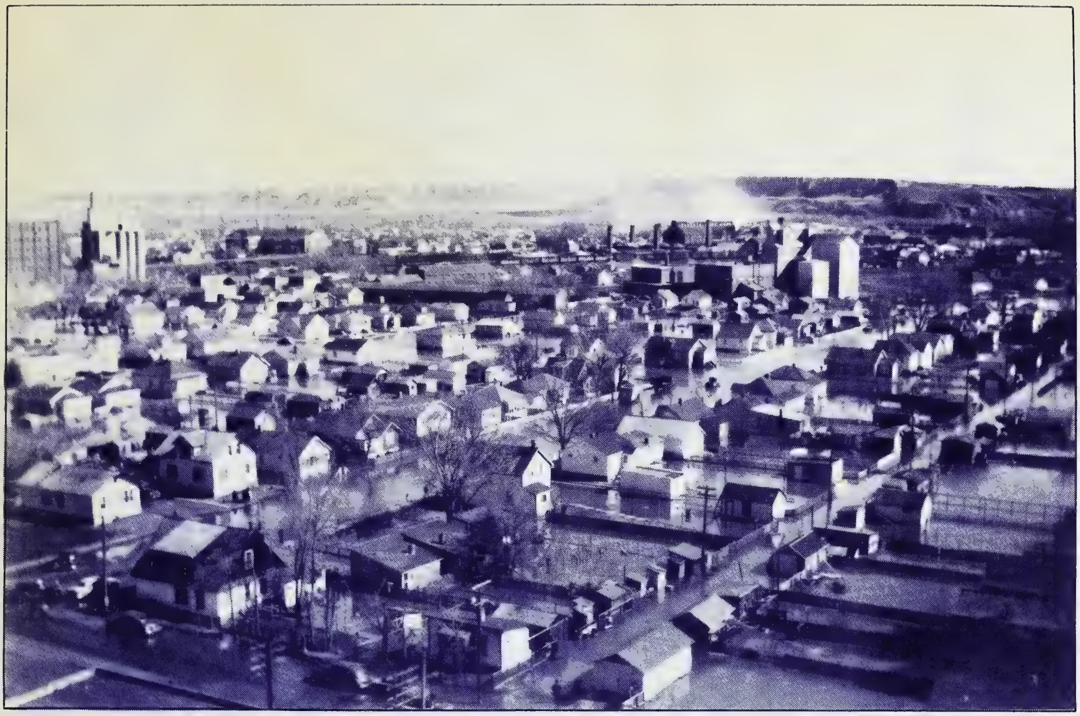


Photo 7: Flooding along Seventh Avenue (now Kingsway Avenue) in front of Marsh Auto Wreckers. Seven Persons Creek is to the right side of the photo and the Ogilvie Flour Mill is in the upper left.

Date: circa March 31, 1952

Source: Medicine Hat Museum (S. Weiler)

1952 Flood Photographs

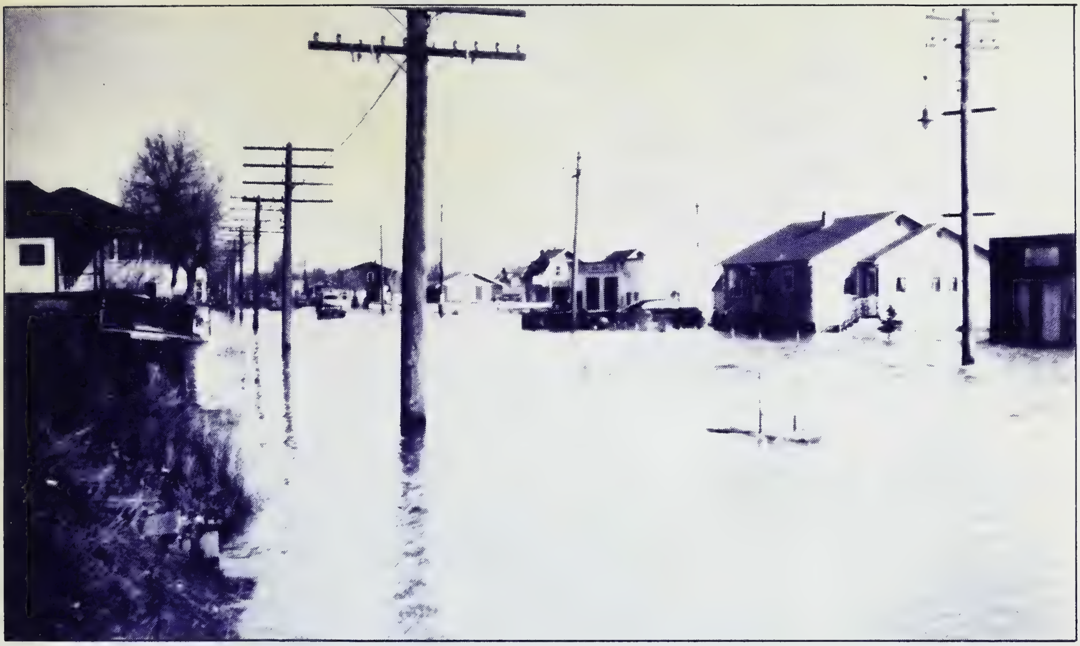


Photo 8: Flooding along Seventh Avenue (now Kingsway Avenue) north of Dunmore Road bridge (looking north).

Date: circa March 31, 1952

Source: Medicine Hat Museum (S. Weiler)

1952 Flood Photographs

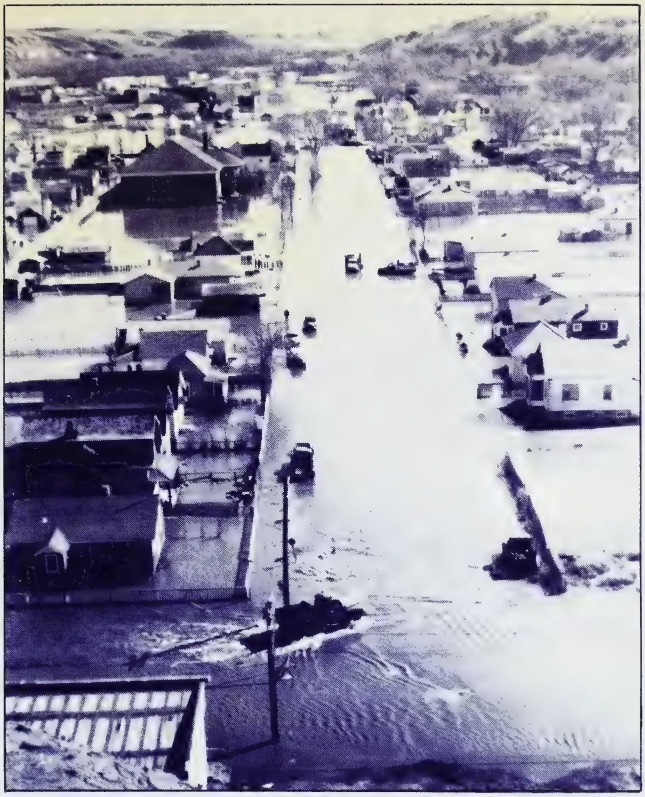


Photo 9: Flooding along 11 Street, S.E., looking east from Seventh Avenue (now Kingsway Avenue). Queen Elizabeth School is in upper left of photo.

Date: circa March 31, 1952

Source: Medicine Hat Museum (S. Weiler)

1952 Flood Photographs

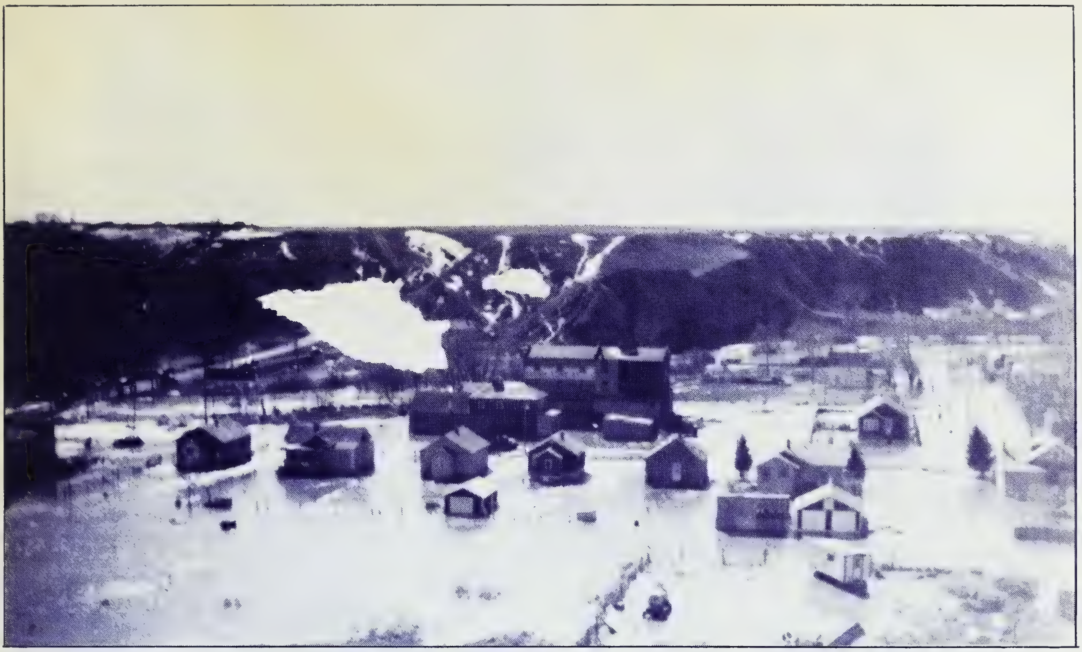


Photo 10: Seven Persons Creek overflowing its banks west of Dunmore Road. Spencer Street can be seen across centre of photo. Dunmore Road is in the upper left.

Date: circa March 31, 1952

Source: Medicine Hat Museum (S. Weiler)

1952 Flood Photographs

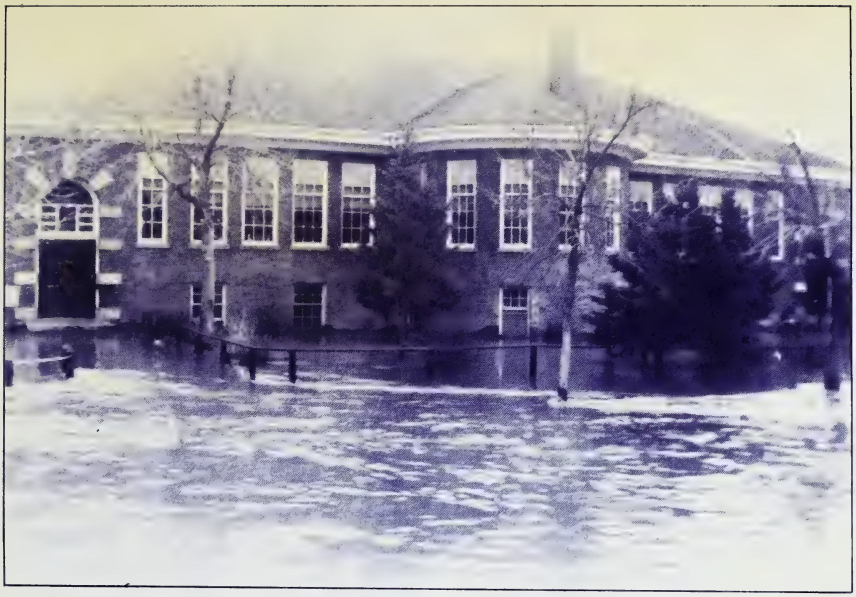


Photo 11: Flooding around Queen Elizabeth School on the north side of 11 Street, S.E.

Date: March 31, 1952

Source: Mr. and Mrs. A.J. Staffard Leflar

Special Note : Highwater Mark = Elev. 661.4
(Entrance to school building)

1952 Flood Photographs

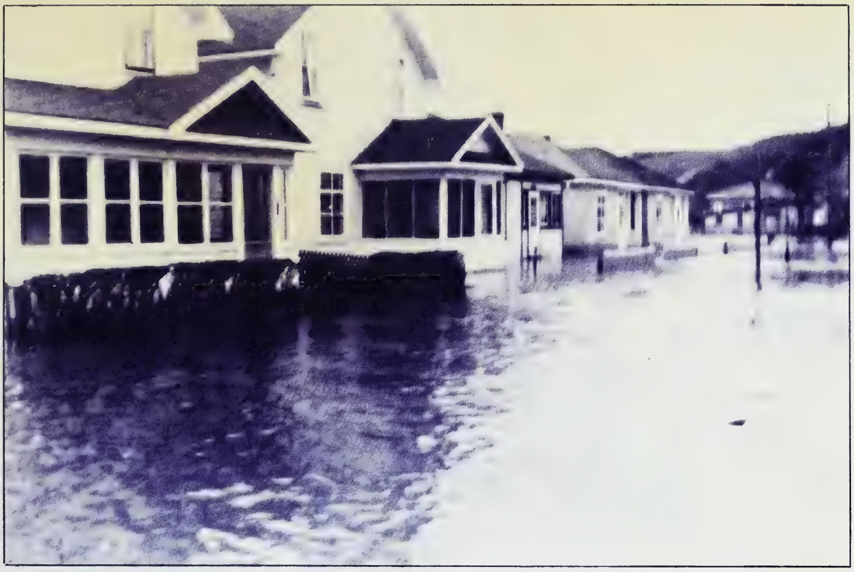


Photo 12: Flooding on the south side of 11 Street, S.E., opposite the Queen Elizabeth School.

Date: March 31, 1952

Source: Mr. and Mrs. A.J. Staffard Leflar

1952 Flood Photographs

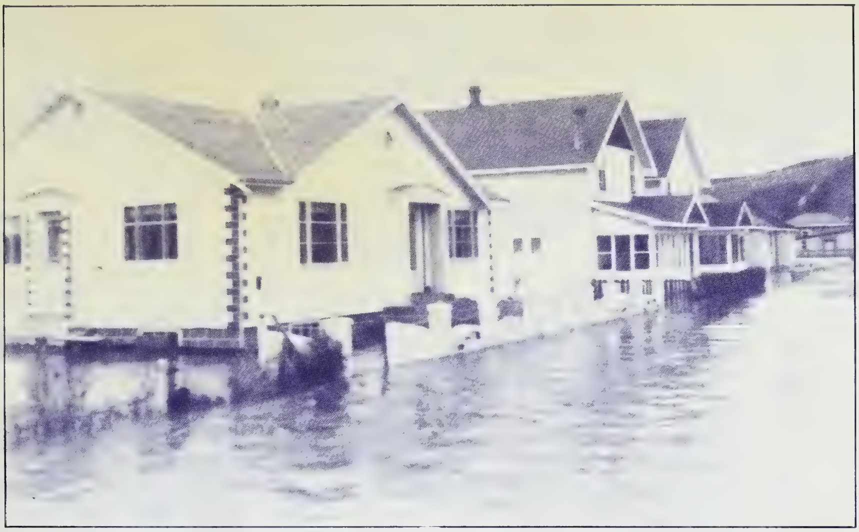


Photo 13: Flooding on the south side of 11 Street, S.E., just east of Queen Elizabeth School. The house in the foreground is at 829 - 11 Street, S.E.

Date: March 31, 1952

Source: Mr. and Mrs. A.J. Staffard Leflar

Special Note : Highwater Mark = Elev. 661.1
(Northeast corner of house)

1953 Flood Photographs

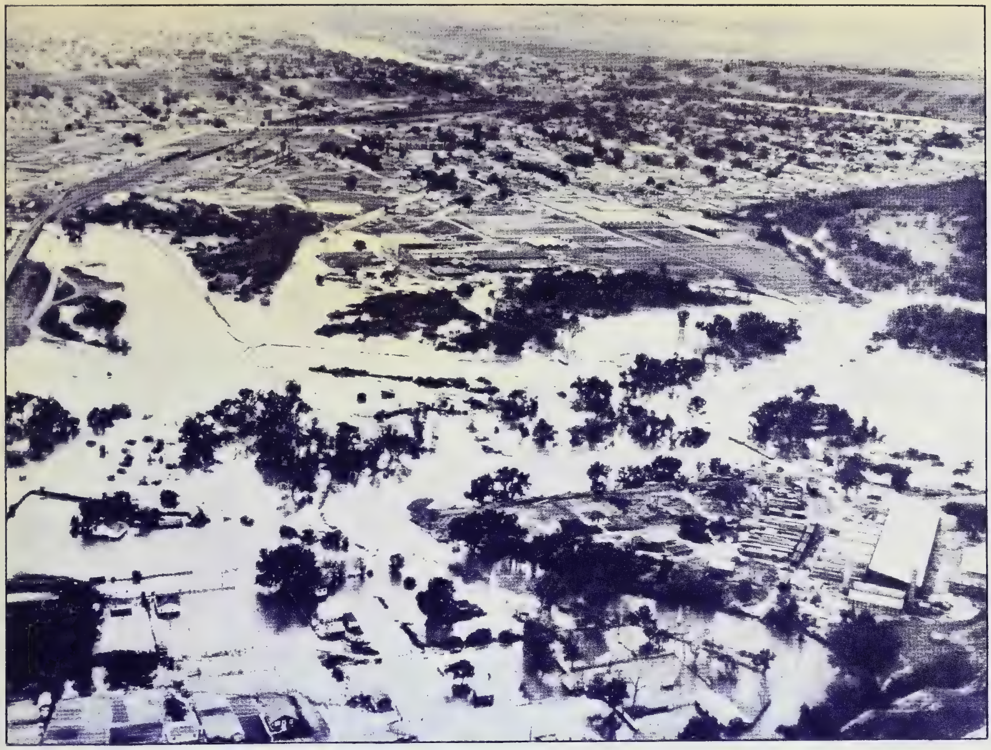


Photo 14: Looking west across the City of Medicine Hat. Water is backed up Ross Creek and Seven Persons Creek causing flooding in the South Flats district. The Purmal subdivision is located in the lower foreground of the photo.

Date: June 11, 1953

Source: Water Survey of Canada (Calgary Herald Photo)

1953 Flood Photographs

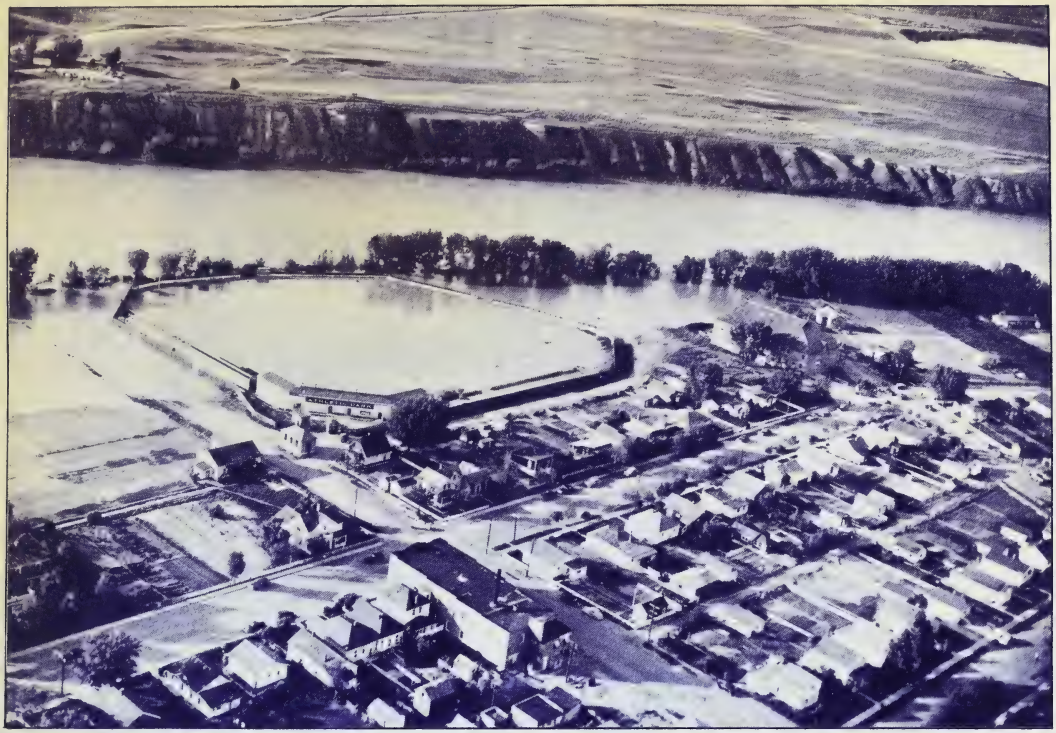


Photo 15: Looking north across the flooded Athletic Park and the South Saskatchewan River. The river is near maximum stage. A temporary dike has been constructed around the old hospital building just to the right of the Athletic park to prevent flooding.

Date: June 11, 1953

Source: Water Survey of Canada (Calgary Herald Photo)

1975 Flood Photographs

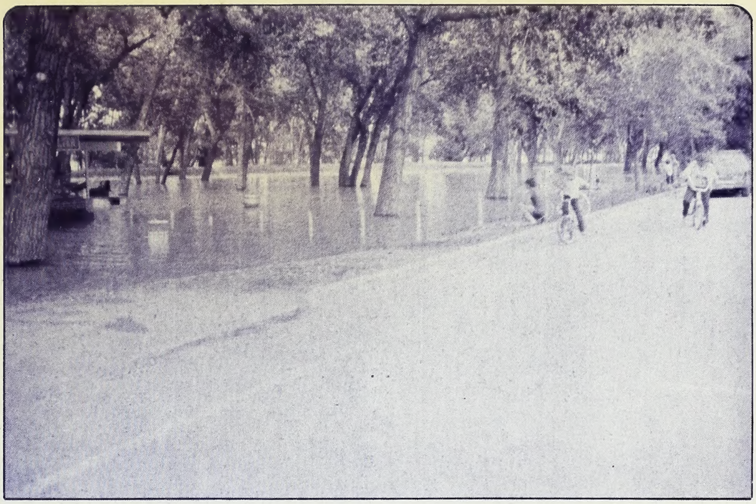


Photo 16: Flooding in Lion's Park along the South Saskatchewan River east of the greenhouses.

Date: circa June 23, 1975

Source: Alberta Environment

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